FINAL REPORT
VOLUME I

WELLSITE EVALUATIONS
AREAS OF ALLEGED RELEASES
SUSQUEHANNA COUNTY, PENNSYLVANIA

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EXECUTIVE SUMMARY

URS Corporation (URS) was retained to investigate allegations made by Ex. 6 - Personal Privacy regarding environmental impacts to soil and surface water from natural gas drilling operations conducted by Cabot Oil & Gas Corporation (Cabot) in Springville and Dimock Townships, Susquehanna County, Pennsylvania. In response to Ex. 6 - Personal Privacy allegations, Cabot launched an investigation of the conditions and potential environmental impact of those conditions at well sites identified by Ex. 6 - Personal Privacy A Work Plan was developed based on site meetings led by Ex. 6 - Personal Privacy and attended by his attorney (Mr. Paul Schmidt), the Pennsylvania Department of Environmental Protection (PADEP) (Mike O'Donnell, Eric Rooney, and Sean Robbins), Fulbright & Jaworski L.L.P. (Mr. Ken Komoroski and Ms. Amy Barrette), Cabot (Phil Stalnaker and Phillip Hill), and URS (Ex. 4 - CBI) held on Friday, December 18, 2009.

This Work Plan was prepared to allow implementation of soil and surface water studies. These studies were then performed by URS to demonstrate that any releases or incidents alleged by Ex. 6 - Personal Privacy were either confirmed or proven not to have occurred and, to the extent that detectible concentrations of constituents of concern or pollutants were identified, these constituents were either remediated or confirmed to exist below the established action levels. Where appropriate, test pits were excavated by URS to demonstrate that areas were investigated even where Ex. 6 - Personal Privacy was unsure of the precise locations of alleged incidents.

This report summarizes the results of implementation in late 2009 and 2010 of the Work Plan developed to address allegations by Ex. 6 - Personal Privacy garding eleven (11) Wellsites in Dimock and Springville Townships, Pennsylvania. Based on our investigation of conditions, it was decided to do assessment at two additional Wellsites (Ex. 6 - Personal Privacy 1 and Ex. 6 - Personal Privacy 6) unrelated to Ex. 6 - Personal Privacy allegations.

The investigation observed detectible concentrations of various constituents in the vicinity of some of the Wellsites investigated. These observations are not surprising and are anticipated with any investigation. Overall, metals were the most commonly detected of the constituents in soil, groundwater, and surface water samples. The most common naturally-occurring mineral-forming metals such as aluminum, iron, manganese, magnesium, potassium, and sodium were identified in the majority of samples. The presence of these

metals are indicative of the normal mineral content of the soil, groundwater, and surface water sampled and do not provide evidence of a release.

For soil, no constituent was detected above its respective Statewide Health Standard (SHS) residential, used-aquifer (R-U) Medium-Specific Concentration (MSC), except for manganese in a few isolated soil samples, and arsenic in soil. However, these Wellsites meet PADEP's standards under Act 2 for manganese and arsenic. Arsenic concentrations were within the range of naturally-occurring background concentrations observed in the area. Arsenic was detected above its SHS R-U MSC sporadically across the study area, both in soil and fill materials used to construct Wellsites. Arsenic or arsenic-based compounds are not known to be used in drilling or hydraulic fracturing or in substances that are alleged by [redacted] to have been released at the various Wellsites evaluated. The range of arsenic concentrations detected is narrow, with no soil sample showing arsenic above 42.6 mg/kg. Prior studies of naturally occurring arsenic in soil performed by Cabot in Dimock and Springville Townships have shown that the natural background concentration of arsenic has been up to 236 mg/kg. Arsenic at the observed concentrations is representative of the range of native content in soil and bedrock in the study area and within the naturally-occurring background concentrations in the area of these Wellsites. The observed arsenic concentrations are, therefore, due to the presence of naturally-occurring minerals in the soil and sediment of the region.

This study also involved analyses for a variety of indicator parameters in soil and surface water that, although not regulated (there is not an established MSC under Act 2), could indicate releases from the natural gas industry operations conducted at these Wellsites. These "indicator parameters" include chloride (chloride in a water leachate from soils according to American Society for Testing and Materials (ASTM) standard D3987-85 (ASTM chloride in soil)), Methylene Blue Active Substances (MBAS – surfactants), ethylene glycol, diesel range organics (DRO), and other indicator parameters listed in **Appendix A, Table 2**, page 5. These parameters were not commonly present in soil or surface water at the Wellsites evaluated. Of the 13 Wellsites studied, one or more of these indicator parameters were detected at six. MBAS were detected in soil at [redacted] 1H [redacted] 1H, [redacted] 1H/5H7H, and Gesford 2/7H NW. Either DRO or regulated diesel constituents were detected in soil at [redacted] 1H, [redacted] 4/6H, [redacted] 2/7H NW and [redacted] 3/9. DRO were detected in surface water at one Wellsite ([redacted] 5), but in the upstream sample relative to this Wellsite.

URS also collected twenty-four samples of surface water in the vicinity of each of the Wellsites. The results were compared to numeric concentrations adopted by PADEP under Pennsylvania's surface water quality criteria. PADEP uses the surface water quality criteria to evaluate, based on data collected over time and in multiple locations in accordance with the State monitoring plan, whether surface water in the State supports various aquatic and human uses. No constituent was detected above the surface water quality criteria except for aluminum and iron, which were detected above the surface water quality criteria for aquatic life in seven of twenty-four unfiltered samples collected at different locations in the vicinity of nine of the thirteen sites. Dissolved iron was detected above the surface water quality criteria for human health in one sample collected from a wetland in the vicinity of one site. No other constituents were detected above the surface water quality criteria, as would have been expected if the observations were attributable to drilling activities.

The observed range of concentrations of aluminum and iron in surface water samples collected from streams in the vicinity of the Wellsites is consistent with expected variability in sediment and surface water quality for streams near the study area, as reflected in data collected by the U.S. Geological Survey (USGS). Concentrations of total aluminum and total iron observed in wetland environments and ponds sampled as part of this investigation observed total aluminum and total iron concentrations that range higher than in the streams sampled, but are still within the anticipated range of concentrations for the pond and wetland environments, where aluminum and iron concentrations vary widely due to a variety of naturally-occurring detritus and humic material that collects in areas of standing water and variables ~~such~~ as depth, rainfall, use, turbidity, and water chemistry. The observed results do not indicate a release or impacts to streams, ponds or wetlands related to Cabot's drilling activity at any Wellsite, as discussed in more detail in Section 4 of this report.

The results of sampling and analysis of soil from soil borings and test pits, as well as surface water samples, are summarized by individual Wellsite below.

Ex. 6 - Personal Privacy 1H Wellsite

Sampling and analysis of soil from two soil borings (2 samples) and 12 surface soil locations (12 samples), and surface water samples from two locations (2 samples) at the Ex. 6 - Personal Privacy 1H Wellsite identified the following:

- Low levels (less than 1 mg/l) of the indicator parameter MBAS were observed in subsurface soil at this Wellsite in one of two samples. MBAS could be indicative of either naturally occurring or man-made surfactants;
- Metals detected in soil were observed at concentrations below their SHS R-U MSCs;
- No volatile Organic Compounds (VOCs) or Semi-Volatile Organic Compounds (SVOCs) were detected in soil above their respective SHS R-U MSCs; and
- Surface water sampling in 2008 shortly after the suspected release detected metal constituents as total recoverable in concentrations higher than the surface water quality criteria. However, as of late 2009, no constituent was detected in the two surface water samples above the surface water quality criteria except for total aluminum in one of the two downgradient, unfiltered samples, which was very slightly higher than the surface water quality criteria for aquatic life. These observations are consistent with expected variability in sediment and surface water quality. They do not indicate current surface water impacts at the [redacted] 1H Wellsite.

URS later installed three groundwater monitoring wells and sampled them in November 2010, March 2011, June 2011, and August 2011. The results of the quarterly sampling for a one-year period demonstrate attainment of the SHS R-U MSC for groundwater at the downgradient point of compliance (MW-1) under Act 2. Results of confirmational soil sampling and groundwater monitoring in 2010 and 2011, as well as surface water sampling done shortly after the suspected release, are reported separately in a Remedial Investigation and Final Report ("Final Report") on this Wellsite submitted to PADEP by Cabot with this report.

The 2010-2011 groundwater findings detailed in the Final Report are summarized below:

- As is typical in groundwater sampling, total and dissolved metals were detected in most groundwater collected. Concentrations of all constituents were below their respective MSCs at the point of compliance ("POC") well, demonstrating attainment of the SHS R-U MSCs; and
- No TCL VOCs or TCL SVOC were detected in groundwater samples at concentrations above their respective SHS R-U MSCs for all samples.

URS also conducted confirmational sampling to evaluate for soil impacts in the area of the seep. Arsenic and manganese in soil downhill from the well pad both exceeded their respective SHS R-U MSC in two of 12 randomly-located samples. These findings

demonstrate attainment of the SHS R-U MSCs under the 75%-10X Rule (PA Title 25, §250.707(b)(1)(i)) for arsenic and manganese. Random sampling locations were determined using PADEP's systematic random sampling protocol.

Ex. 6 - Personal Privacy 1H Wellsite

Sampling and analysis of soil from 9 test pits (18 samples) and surface water samples from two locations (2 samples) at the Ex. 6 - Personal Privacy 1H Wellsite identified the following:

- MBAS (one sample) and DRO (two samples) were detected in three of the 18 samples analyzed; however, these constituents are indicator parameters and as such, are not regulated (there is not an established MSC under Act 2). The regulated petroleum constituents in samples exhibiting DRO were present below the respective SHS R-U MSCs;
- SVOCs were not detected above their respective SHS R-U MSCs;
- None of the VOCs, SVOCs, and petroleum hydrocarbons were detected in surface water samples, and no metals were detected their respective surface water quality criteria; and
- Chloride and total dissolved solids (TDS) were not detected in either surface water sample at concentrations above surface water quality criteria.

Ex. 6 - Personal Privacy 1 Wellsite

- Sampling and analysis of soil from two soil borings (2 samples) and surface water samples from two locations (2 samples) at the Ex. 6 - Personal Privacy 1 Wellsite identified that none of the constituents analyzed under the Pit/Frac Suite of compounds (**Appendix A – Table 2**) were present in either the soil at concentrations above their respective applicable SHS R-U MSCs or the surface water at concentrations above the relevant water quality criteria. The Pit/Frac Suite of Compounds was developed with input from PADEP to investigate the potential for the content of drill pits or hydraulic fracturing fluids to have been released into the environment.
- No constituent was detected in surface water above its respective surface water quality criteria for human health. No constituent was detected above its respective surface water quality criteria for aquatic life except total aluminum and total iron in an unfiltered, downgradient stream sample. These observations are consistent with expected variability in sediment and surface water quality. They do not indicate

releases or surface water impacts related to Cabot's operations at the Ex. 6 - Personal Privacy 1 Wellsite.

Ex. 6 - Personal Privacy 1 Wellsite

Sampling and analysis of soil from two soil borings (2 samples) and surface water samples from two locations (2 samples) at the Ex. 6 - Personal Privacy 1 Wellsite identified the following:

- Indicator parameters DRO, MBAS, and ethylene glycol were not detected in any of the soil or surface water samples analyzed;
- VOCs and SVOCs were not detected in soil above their respective SHS R-U MSCs. No VOCs or SVOCs were detected in surface water samples above the laboratory reporting limit;
- Arsenic was present at 12.5 mg/kg in one of the two samples analyzed above its SHS R-U MSC of 12 mg/kg, which is within the range of naturally-occurring arsenic for soils. The remainder of the metals analyzed were not detected in soil above their respective SHS R-U MSCs.
- No constituent was detected in surface water above the human health-based surface water quality criteria for human health. No constituent was detected above its respective surface water quality criteria for aquatic life except total aluminum and total iron in the unfiltered sample from the pond. No other metal or other constituent was detected above the surface water quality criteria, as would have been expected to be observed had these observations been attributable to drilling activities. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality. These observations do not indicate releases or surface water impacts related to Cabot's operations at the Ex. 6 - Personal Privacy 1 Wellsite; and
- Chloride and TDS were not detected in either surface water sample at concentrations their respective surface water quality criteria.

[redacted] 1H/5H/7H SE Wellsite

Sampling and analysis of soil from four soil test borings (4 samples) and four test pits (8 samples) at the [redacted] 1H/5H/7H SE Wellsite identified the following:

- For the soil samples for the soil test boreholes:
  - Indicator parameters MBAS and ASTM chloride in soil were not detected in three of the four soil samples. In the fourth soil sample, results for both parameters

were only slightly above the laboratory reporting limits; therefore, in conjunction with the other data collected, are not considered to be a concern;

- Ethylene glycol was not detected above the laboratory reporting limit;
- The VOCs acetone, methyl ethyl ketone (2-butanone), and toluene were detected in soils below their respective SHS R-U MSCs. The SVOC m&p-cresols was detected above the laboratory detection limit, but below its SHS R-U MSC. No other SVOCs were detected in the soil samples from the soil test boreholes.
- No metals were detected in soil samples at concentrations above their respective SHS R-U MSCs.

- For the soil samples from the four test pits (8 samples), all analytes for parameters on the PA Short List for Diesel (**Appendix A – Table 2**) were not detected above the laboratory reporting limit.

[redacted] 2 Wellsite

Sampling and analysis of soil from two soil test boreholes (2 samples) and surface water samples from two locations at the [redacted] 2 Wellsite identified the following:

- MBAS and ASTM chloride in soil were not detected in either of the two soil samples analyzed;
- Ethylene glycol was not detected in soil in either of the samples analyzed;
- The VOCs acetone, methyl ethyl ketone (2-butanone), and toluene were detected in soil below their respective SHS R-U MSCs. No SVOCs were detected in either soil sample. No VOCs or SVOCs were detected in surface water;
- Arsenic was present in the two samples analyzed (19.6 and 15.4 mg/kg) above its SHS R-U MSC of 12 mg/kg, which is within the range of naturally-occurring arsenic for soils in the area. Other metals detected in soil were all observed at concentrations less than their respective SHS R-U MSCs; and
- No constituent was detected in surface water above its surface water quality criteria for human health. No constituent was detected above its surface water quality criteria for aquatic life except total aluminum and total iron in the unfiltered downgradient stream sample. No other metals or other constituents exceeded its surface water quality criteria, as would have been expected to be observed if these results were attributable to drilling activities. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality. They do not indicate impacts related to Cabot's operations at the [redacted] 2 Wellsite.

[redacted] 4/6H Wellsite

Sampling and analysis of soil from 7 test pits (14 samples) and three surface water samples from two locations at the [redacted] 4/6H Wellsite identified the following:

- ASTM chloride in soil was detected in four of the 14 soil samples analyzed; however, this parameter is not regulated in soils, and there is not an established MSC under Act 2. Neither chloride nor TDS were detected in surface water above the surface water quality criteria. The concentrations of ASTM chloride in soil observed would not be expected to impact nearby surface waters or groundwater;
- Indicator parameters ethylene glycol and MBAS were not detected in soil;
- The indicator parameter DRO was detected in five of the 14 samples analyzed. However, analysis of the samples for the PA Short List for Diesel shows that none of these compounds were present in the soil samples at concentrations above their respective SHS R-U MSCs;
- No SVOCs were detected in soil samples above their respective SHS R-U MSCs;
- VOCs and SVOCs, and the indicator parameters ethylene glycol, MBAS and DRO, were not detected in surface water samples above the laboratory reporting limit. No metals or chloride were detected in surface water samples were at concentrations above the surface water quality criteria; and
- The pH of two of the three surface water samples was outside of (lower than) the range of the surface water quality criteria for aquatic life. The field duplicate for the seep sample had a pH within the surface water quality criteria, showing that this condition is variable and within the range expected for this water body.

[redacted] 2/7H NW Wellsite

Sampling and analysis of soil from 16 test pits (33 samples) at the [redacted] 2/7H NW Wellsite identified the following:

- ASTM chloride in soil was detected in seven of the 33 soil samples analyzed; however, this parameter is not regulated in soils, and there is not an established MSC under Act 2.
- Indicator parameter MBAS was detected in soil in one of the samples analyzed. No impact to nearby surface or groundwater could be expected as a result of this detection;

- Arsenic was detected above its SHS R-U MSC in 28 of the 33 samples analyzed, with a maximum observed concentration of 42.6 mg/kg, which is within the range of naturally-occurring arsenic for soil in the area. The remaining metals analyzed were all at concentrations less than their respective SHS R-U MSCs in all samples; and
- VOCs and SVOCs analyzed were not detected in soil at concentrations above their respective SHS R-U MSCs.

Ex. 6 - Personal Privacy 3/9 Wellsite

Sampling and analysis of soil from five soil borings (6 samples) and six soil test pits (13 samples) and surface water samples from two locations at the Ex. 6 - Personal Privacy 3/9 Wellsite identified the following:

- Indicator parameters ASTM chloride in soil, ethylene glycol, and MBAS were not detected in any of the six soil boring samples analyzed;
- Arsenic was detected in soil above its SHS R-U MSC in each of the six soil samples from the soil borings, with a maximum observed concentration of 35.6 mg/kg, which is within the range of naturally-occurring arsenic for soil. Manganese ws detected above its SHS R-U MSC in one of six samples. All other metals analyzed were all observed at concentrations less than their respective SHS R-U MSCs for all samples;
- The VOCs detected were present at concentrations below their respective SHS R-U MSCs. No SVOCs were present at concentrations above their respective SHS R-U MSCs;
- Potential constituents on the PA Short List for Diesel were detected in both soil samples from one test pit (P1) at concentrations below their respective SHS R-U MSCs; however, these constituents were not detected in any of the remaining ten soil samples from the surrounding test pits;
- Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in either surface water sample;
- VOCs and SVOCs, and the indicator parameter DRO were not detected in surface water samples above the laboratory reporting limit; and
- Metals were not detected in surface water samples at concentrations above their respective surface water quality criteria.

[redacted] 2 Wellsite

Sampling and analysis of soil from two soil borings (2 samples) and 4 test pits (9 samples), and surface water samples from three locations at the [redacted] 2 Wellsite identified the following:

- ASTM chloride in soil, ethylene glycol, MBAS, VOCs, and SVOCs were not detected in either of the two soil samples from the soil test boreholes;
- Diesel constituents on the PA short list for Diesel were not detected above their respective laboratory reporting limits or their respective SHS R-U MSCs in the 9 samples of soil samples from the test pits;
- No metals were detected above their respective SHS R-U MSCs in any of the soil boring samples;
- Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in any of the three surface water samples;
- VOCs and SVOCs, and the indicator parameter DRO were not detected in surface water samples above the laboratory reporting limit; and
- No constituent was detected in surface water above its surface water quality criteria for human health. No constituent was detected above its surface water quality criteria for aquatic life except total aluminum and total iron in the unfiltered sample from the pond. No other metal or other constituent exceeded its surface water quality criteria, as would have been expected to be observed if these results were attributable to drilling activities. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality. The aluminum and iron observations do not indicate impacts related to Cabot's operations at the Lewis 2 Wellsite.

[redacted] 5 Wellsite

Sampling and analysis of soil from two soil test borings (2 samples) and surface water samples from three locations (3 samples) at the [redacted] 5 Wellsite identified the following:

- VOCs and SVOCs, and the indicator parameters ASTM chloride in soil, ethylene glycol, MBAS, were not detected in the two soil samples from the soil test boreholes;
- Arsenic was detected in soil above its SHS R-U MSC in one of the two soil samples analyzed, at a concentration of 14.1 mg/kg. Other metals analyzed were all observed at concentrations less than their respective SHS R-U MSCs.

- VOCs and SVOCs were not detected in surface water samples above the laboratory reporting limit. Metals were not detected in surface water samples at concentrations above the surface water quality criteria;
- Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in any of the three surface water samples ; and
- The indicator parameter DRO was detected in one surface water sample (upgradient) above the laboratory reporting limit. This finding was for the upstream sample and does not indicate any concern related to the Wellsite.

[redacted] 6 Wellsite

Sampling and analysis of soil from one test pit (13 samples) and surface water samples from two locations at the Teel 6 Wellsite identified the following:

- Ethylene glycol and regulated petroleum hydrocarbon constituents (combined lists of all PA Short Lists for Petroleum Products) were not detected in any of the 13 soil test pit samples analyzed above the laboratory reporting limit;
- Lead was detected in soil but below its SHS R-U MSC; and
- Constituents on the PA Short List for Diesel were not detected in surface water samples above the laboratory reporting limit.

[redacted]7 Wellsite

Sampling and analysis of soil samples from two soil borings (2 samples) and surface water samples at four locations (4 samples) at the [redacted] 7 Wellsite identified the following:

- ASTM chloride in soil, ethylene glycol, MBAS, VOCs, and SVOCs were not detected in either of the soil boring samples analyzed, with the exception of the VOC acetone (which is a common laboratory contaminant). Acetone was present at concentrations below its SHS R-U MSC;
- Metals detected in soil were at concentrations below their SHS R-U MSC;
- Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in each of the four surface water samples. The pH of the water in one of the wetland samples was outside of (lower than) the range of the surface water quality criteria for aquatic life, but within the range anticipated for a natural wetland environment;
- The indicator parameter DRO and regulated petroleum constituents were not detected in any of the surface water samples above the laboratory reporting limit.

- VOCs and SVOCs were not detected in surface water samples above the laboratory reporting limit, with the exception of bis(2-ethylhexyl) phthalate in one of the samples from the wetland that was detected slightly above the laboratory reporting limit, but did not exceed the surface water quality criteria; and
- No constituents were detected above the surface water quality criteria except total aluminum and total iron in the two samples from the wetlands, which exceeded the surface water quality criteria for aquatic life, and iron in one sample from one of the wetlands, which exceeded the surface water quality criteria for human health. No other metals or other constituents were detected above their surface water quality criteria, as would have been expected had the results been attributable to drilling activities. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality in pond and wetland environments. They do not indicate releases or impacts related to Cabot's operations at the [redacted] Wellsite.

1.0 INTRODUCTION

URS Corporation (URS) was retained to investigate allegations made by Ex. 6 - Personal Privacy regarding purported environmental impacts to soil and surface water from natural gas drilling operations conducted by Cabot Oil & Gas Corporation (Cabot) in Springville and Dimock Townships, Susquehanna County, Pennsylvania. In response to Ex. 6 - Personal Privacy allegations, Cabot launched an investigation of the conditions and potential environmental impact of those conditions at Wellsites identified by Ex. 6 - Personal Privacy As part of the ongoing investigation, Cabot requested that URS prepare a Work Plan detailing the scope of work designed to evaluate potential environmental issues that may exist, based on Ex. 6 - Personal Privacy representations to Cabot and the Pennsylvania Department of Environmental Protection (PADEP). A Work Plan was developed based on site meetings led by Ex. 6 - Personal Privacy and attended by his attorney (Mr. Paul Schmidt), PADEP (Mike O'Donnell, Eric Rooney, and Sean Robbins), Cabot (Phil Stalnaker and Phillip Hill), Fulbright & Jaworski L.L.P. (Mr. Ken Komoroski and Ms. Amy Barrette), and URS held on Friday, December 18, 2009 and on other information as described in more detail in **Section 4.0** of this report.

This Work Plan was prepared to allow implementation of soil and water studies. These studies were then performed by URS to demonstrate that any releases or incidents alleged by Ex. 6 - Personal Privacy were either confirmed or proven not to have occurred and, to the extent that detectible concentrations of constituents of concern or pollutants were identified, these constituents were either remediated or confirmed to exist below the established action levels. Where appropriate, test pits were excavated by URS to demonstrate that areas were investigated even where Mr. Ely was unsure of the precise locations of alleged incidents.

This report summarizes the results of implementation of the Work Plan developed to address allegations by Ex. 6 - Personal Privacy regarding eleven (11) Wellsites in Dimock and Springville Townships, Susquehanna County, Pennsylvania. Based on our investigation of conditions, it was decided to do assessment at two additional Wellsites (Ex. 6 - Personal Privacy 1 and [redacted] 6) unrelated to Ex. 6 - Personal Privacy allegations.

Prior to completion of the Work Plan, URS collected two rounds of water and soil samples near eight (8) of the Wellsites in question. The locations of these samples were based upon information available to URS at the time in relation to Ex. 6 - Personal Privacy allegations.

This report summarizes the results of implementation of the Work Plan developed to address allegations by Ex. 6 - Personal Privacy egarding eleven (11) Wellsites. Other potential releases unrelated to Ex. 6 - Personal Privacy allegations were also investigated regarding two (2) additional Wellsites (the W. Chudleigh 1 and the Teel 6 Wellsites) operated by Cabot in Dimock and Springville Townships, Susquehanna County, Pennsylvania.

Implementation of the Work Plan involved review of previous reports and sampling of soil and surface water in locations where impacts might be expected to be found had the alleged releases occurred, including drilling and sampling of soil from soil borings, excavation of exploratory test pits and sampling of soil, and collection of surface water samples from streams, wetlands, springs, and ponds near the Wellsites.

1.1 OBJECTIVES

The objectives of this investigation included:

- Evaluation of historic reports documenting accidental releases and subsequent reporting, cleanup and Act 2 submittals.
- Evaluation of surface and subsurface soil quality for evidence of impacts that could be attributed to the alleged releases.
- Assessment of the nature of soil and fill on and beneath the surface of the Wellsites for evidence of releases.
- Evaluation of surface water quality for evidence that the alleged releases migrated to or impacted the quality of nearby streams, ponds, and wetlands.
- Review and interpretation of the findings of soil and surface water sampling and analysis relative to the various environmental quality standards promulgated for the specific media sampled.

2.0 SCOPE OF WORK PERFORMED

URS investigated soil and surface water quality, in varying combinations, at each of 11 Wellsites in response to allegations made by Ex. 6 - Personal Privacy that various natural gas well drilling fluids and petroleum products were released to the environment and 2 additional Wellsites based on other information as described in more detail in **Section 4.0** of this report. The Wellsites and pad areas included in this investigation are listed below:

- Ex. 6 - Personal Privacy 1H
- Ex. 6 - Personal Privacy 1H
- Ex. 6 - Personal Privacy 1
- Ex. 6 - Personal Privacy 1
- 1H/5H/7H SE
- 2
- 4/6H
- 2/7H NW
- 3/9
- 2
- 5
- 6
- 7

A variety of analytical suites were assigned to each Wellsite investigation based on the nature of the purported releases in order to confirm or refute the presence of the allegedly released substances. Regulated metals and organic compounds were analyzed in addition to a series of indicator parameters that could be attributable to the fluids alleged to have been released. For example, hydraulic fracturing fluids have surfactants added; therefore, analysis for the presence of surfactants (MBAS) as an indicator parameter was performed where such fluids were purported to have been released as an indicator parameter. It should also be noted that MBAS can be associated with other human activities and can also be naturally-occurring. The target analytes are not all regulated with a Medium Specific Concentration (MSC) for human health risk or cleanup; however, each is considered to be an indicator parameter the presence of which at or above threshold concentrations could

indicate that a past release may have occurred, which may require further investigation or evaluation to confirm. The sections that follow describe the allegations made and the scope of investigation conducted in response to each allegation.

URS collected and analyzed field duplicate samples of soil and surface water at selected locations as a quality check on the reproducibility of field sampling and laboratory analytical methods. Where collected, the duplicate sampling and analysis are indicated in the applicable sections below.

For the purposes of completeness and thoroughness of this investigation, Ex. 6 - Personal Privacy allegations are stated as plainly and as candidly as possible as presented by Ex. 6 - Personal Privacy

2.1 Ex. 6 - Personal Privacy 1H WELLSITE

Ex. 6 - Personal Privacy Allegation: Ex. 6 - Personal Privacy asserts that there is a drill pit that continues to leach black liquid and the pit should have been removed. He alleges that the spring has been contaminated and that fish were killed in a nearby pond.

2.1.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 1H Wellsite

URS collected surface water samples at two locations and analyzed them for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts. One catchment basin and the outlet from the adjacent pond (both immediately downgradient of the seep area from the Wellsite) were sampled.

As discussed with PADEP (12/18/09), URS advanced 2 soil test boreholes immediately downgradient of the location of the reserve pit. URS examined and logged the subsurface materials for visible indications of impacts. The soil sample(s) were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**). Analytical results from soil and surface water sampling were evaluated to address the allegation that materials in the pit could represent an ongoing release to seep and/or the pond.

URS reviewed reports submitted on behalf of Cabot regarding the disposition of the remediation system currently in place at the Wellsite.

2.2 Ex. 6 - Personal Privacy 1H WELLSITE

Ex. 6 - Personal Privacy alleges that 168,000 gallons of fluids were put down the well and approximately 16,000 gallons came back, and that fluid purportedly ran down the hillside and into a nearby creek. Ex. 6 - Personal Privacy further alleged that there were soap suds in the creek, which Ex. 6 - Personal Privacy claims to have contained by digging a hole with a bulldozer until the water was "sucked up" and put into frac tanks.

2.2.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 1H Wellsite

URS dug test pit excavations at 9 locations distributed across the Wellsite and collected 18 soil samples (at 1-2 ft. and 3-4 ft. below ground surface [bgs] at each location). In addition, URS collected surface water samples from the nearby creek located to the north and northeast. Surface water and soil samples were analyzed for the Extended Analytical Suite (**Appendix A – Tables 1 and 2, respectively**) to evaluate for potential impacts from Wellsite operations.

2.3 Ex. 6 - Personal Privacy 1 WELLSITE

Ex. 6 - Personal Privacy alleged that brine water was trucked to this Wellsite and deposited in the mud pit. Interviews with Wellsite personnel identified the material as three truckloads of drilling fluid, not brine, from the Hunsinger well. Tears in the mud pit liner that could have allowed fluids to infiltrate the subsurface were allegedly observed before the drilling fluid was off-loaded here.

2.3.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 1 Wellsite

URS collected surface water samples at two locations and analyzed them for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts. The most immediate potential downgradient receptor stream was identified and sampled, both upgradient and downgradient of the Wellsite.

URS further evaluated for releases from the drill pit by advancing two soil test boreholes immediately downgradient of the location of the drill pit. URS visually examined and logged the subsurface materials for indication of impacts. The sample(s) were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**).

2.4 Ex. 6 - Personal Privacy 1 WELLSITE

Ex. 6 - Personal Privacy Allegation: Ex. 6 - Personal Privacy contends that the drill pit liner was ripped open in the middle of winter and that a GasSearch Drilling Services Corporation (GDS) supervisor told him not to be concerned and that it would be taken care of.

2.4.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 1 Wellsite

URS collected surface water samples at three locations in the creek immediately to the east of Ex. 6 - Personal Privacy 1 well pad. Samples were collected upgradient and downgradient of the Wellsite and analyzed them for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts. Analytical results from surface water sampling were evaluated to address the allegation that impacts from the pit could potentially have affected the environment.

URS contacted the neighbor immediately downgradient of the Wellsite and inquire about [redacted] Ex. 6 - Personal Privacy further allegation that their water was discolored for a period of time. URS worked with Cabot's water sampling firm, Quantum Analytical & Environmental Laboratories, Inc. (Quantum), to collect a sample of the neighbor's water before any treatment is performed.

As discussed with PADEP (12/18/09), URS advanced two soil test boreholes immediately downgradient of the location of the reserve pit. URS examined and logged the subsurface materials for indications of impacts. The soil sample(s) were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**).

2.5 [redacted] 1H/5H/7H SE WELLSITE

Ex. 6 - Personal Privacy Allegation: Ex. 6 - Personal Privacy alleges that the drill pit was improperly solidified and was backfilled. Ex. 6 - Personal Privacy further contends that diesel fuel spills occurred beneath the drill rig and that attempts were made to cover the spills with plastic. He is concerned that these spills present a risk to his home, property and the creek nearby.

2.5.1 Approach to Investigate Allegations – [redacted] 1H/5H/7H SE Wellsite

URS conducted test pit excavations at four locations distributed across the Wellsite in the reported vicinity of the drill rig and where releases were alleged to have occurred. Eight soil samples were collected (at 1-2 ft. and 3-4 ft. bgs in each test pit) and analyzed for the PA

Short List for Diesel releases (**Appendix A – Table 2**) to evaluate for potential impacts. A visual inspection of this location indicated that there is no creek nearby; however, URS traversed the hillside immediately below the Wellsite to evaluate for seeps.

As discussed with PADEP (12/18/09), URS evaluated for releases from the two reserve pits that were closed on the pad by advancing four soil test boreholes immediately downgradient of the location of the reserve pits. URS visually examined and logged the subsurface materials for indications of impacts. The sample(s) were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**).

2.6 Ex. 6 - Personal Privacy 2 WELLSITE

Ex. 6 - Personal Privacy Allegation: Ex. 6 - Personal Privacy alleges that a GDS supervisor ordered a GDS employee to throw stones to puncture the reserve pit liner so as to give the appearance that Ex. 6 - Personal Privacy sabotaged the Wellsite. Ex. 6 - Personal Privacy alleges that the holes in the pit liner allow material from the pit to be released through the liner, threatening the spring that is used for drinking and bathing.

2.6.1 Approach to Investigate Allegations – [redacted] 2 Wellsite

URS collected surface water samples at two locations and analyzed them for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts, one at the spring located upgradient of the Wellsite and one in the creek fed by the spring, downgradient of the Wellsite and immediately to the east of Ely 2 Wellsite. Analytical results from surface water sampling were evaluated to address the allegation that impacts from the pit could have affected the adjacent spring and creek to the east.

As discussed with PADEP (12/18/09), URS evaluated for releases from the drill pit that was closed on the pad by advancing two soil test boreholes immediately downgradient of the location of the drill pit. URS visually examined and logged the subsurface materials for indications of impacts. The sample(s) were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**).

2.7 [redacted] 4H/ELY 6H WELLSITE

[redacted] Allegation: [redacted] says that hydraulic fracturing fluid was released during the fracturing process. His relative's house, immediately downhill from the Wellsite, had to be evacuated and he is concerned that his relative's water supply and pond have been impacted.

2.7.1 Approach to Investigate Allegations – [redacted]4H/[redacted]6H Wellsite

URS dug test pit excavations at seven locations distributed across the Wellsite, collected 14 soil samples (at 1-2 ft. and 3-4 ft. bgs at each location), and collected water samples from the [redacted] Spring House and Pond. Soil and surface water samples were analyzed for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts.

2.8 [redacted] 2/7H NW WELLSITE

[redacted] Allegation: [redacted] alleges that a diesel fuel spill occurred but was reported to PADEP as a soap discharge. The spilled material can purportedly be found six inches below the gravel, as it was covered with stone.

[redacted] alleges that, approximately six weeks before the interview, recycled water leaked from a tank and impacted with black water a 25' x 15' area that was not fully compacted and thus was porous. [redacted] further alleges that he was directed to cover the spilled material up and that he refused. [redacted] did not contend that any material had left the Wellsite.

2.8.1 Approach to Investigate Allegations – [redacted] 2/7H NW Wellsite

URS conducted test pit excavations at 16 locations distributed across the Wellsite to include the areas identified by [redacted] to have been impacted by frac water and diesel fuel and collect 32 samples (at 1-2 ft. and 3-4 ft. bgs at each location). These soil samples were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**) to evaluate for potential impacts from Wellsite operations.

2.9 [redacted] 3/9 WELLSITE

[redacted] Allegation: [redacted] alleges there were issues with four different pits at this site, that there were various spills including a large diesel fuel spill. His concern is heightened

because his home is located nearby and below this site. He asserts that PADEP knew about one diesel spill, but not a second spill that occurred. He says the second spill was not reported to PADEP and was intentionally covered up with stone. He says PADEP eventually came out and learned that the spill was covered up. Ex. 6 - Personal Privacy also asserts a material that looked like antifreeze accumulated in the well cellar and was not addressed for months.

Ex. 6 - Personal Privacy also contends there was a pile of dirt mixed with diesel fuel on the back side of the site that remained "all summer long" close to a nearby creek that flows past Ex. 6 - Personal Privacy home. He said PADEP sampled the situation and found diesel fuel and that all the dirt was hauled away thereafter.

2.9.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 3/9 Wellsite

URS collected surface water samples at two locations and analyzed them for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts. The creek immediately adjacent to the east of the Wellsite, both upgradient and downgradient of the Wellsite was sampled. Analytical results and reports prepared for and by Cabot from previous surface water sampling were evaluated to address the allegation that impacts from the pits could potentially have affected the adjacent creek.

The location PADEP has documented to have diesel fuel impacts (the area between the former location of the drill rig and the former location of the mud pump) was identified and test pit excavations will be dug at six locations placed to target the area of most likely to have been impacted by the alleged release across the identified area. Two samples from each test pit were collected (at 1-2 ft. and 3-4 ft. bgs at each location). These soil samples were analyzed for the PA Short List for Diesel (**Appendix A – Table 2**) to evaluate for potential impacts. The test pits were also visually inspected for evidence of drilling mud.

As discussed with PADEP (12/18/09), URS evaluated for releases from the reserve pit that was closed on the pad by advancing four soil test boreholes immediately downgradient of the location of the reserve pit. URS visually examined and logged the subsurface materials for indications of impacts. The sample(s) were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**).

2.10 LEWIS 2 WELLSITE

Ex. 6 - Personal Privacy Allegation: Ex. 6 - Personal Privacy asserts that a diesel fuel spill occurred that "laid there all winter" and was reclaimed into the soil bank approximately one year ago when the site was restored to previous grade. Ex. 6 - Personal Privacy feels that several drill pits have been improperly reclaimed and that the liners were carelessly torn in the process of solidifying pit contents.

2.10.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 2 Wellsite

URS collected surface water samples at two locations and analyzed them for the Extended Analytical Suite (**Appendix A – Table 2**) to evaluate for potential impacts from Wellsite operations. The creek immediately to the east of Ex. 6 - Personal Privacy 2 Wellsite, both upgradient and downgradient of the Wellsite, was sampled. Analytical results from surface water sampling in the adjacent creek was evaluated to address the allegation that impacts from the pit could have affected the creek.

The location of the area where the soil that was allegedly impacted with diesel was identified and test pit excavations were conducted at four locations distributed across the identified area with 8 samples collected (at 1-2 ft. and 3-4 ft. bgs at each location). The test pit soil samples were analyzed for the PA Short List for Diesel (**Appendix A – Table 2**) to evaluate for potential impacts.

As discussed with PADEP (12/18/09), URS evaluated for releases from the reserve pit that was closed on the pad by advancing two soil test boreholes immediately downgradient of the location of the reserve pit. URS visually examined and logged the subsurface materials for indications of impacts. The soil boring sample(s) were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**) to evaluate for potential impacts.

2.11 Ex. 6 - Personal Privacy 5 WELLSITE

Ex. 6 - Personal Privacy Allegation: Ex. 6 - Personal Privacy alleges that a spill of diesel fuel occurred and that it was reported to PADEP but the amount was considerably underreported. He asserts that as much as 3,000 gallons was spilled and that it was "all through" the nearby creek area. He further alleges that although the spill occurred in the middle of the night, it was not addressed until 6 a.m. He also asserts that the spill remediation measures were not adequate and that better measures should have been used. He says he believes a GDS supervisor

intentionally moved a reference point hay bale so that PADEP would incorrectly obtain a clean post-remediation soil sample. He asserts that diesel fuel can still be found at that site two feet under the soil/rock surface and that it is leaching into Meshoppen Creek.

Ex. 6 - Personal Privacy also alleges that the reserve pit was not properly closed – that despite solidification efforts, material continued to "ooze" out and the pit was covered with twenty to thirty feet of soil when the Wellsite was reclaimed.

2.11.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 5 Wellsite

URS reviewed reports submitted on behalf of Cabot, including a report prepared by Resource Environmental Management, Inc., 8 Ridge Street, Montrose, PA, which was submitted to the PADEP for the Ex. 6 - Personal Privacy Property. (Notice was published in the PA Bulletin on October 11, 2008).

URS prepared an Act 2 Final Report that evaluated the diesel release that occurred on June 3, 2008, the remediation to address impacts, and demonstrated attainment with the SHS R-U MSCs for the PA Short List for Diesel for the Site. URS re-evaluated the results and conclusions of this report as part of this report addressing Ex. 6 - Personal Privacy allegations.

URS collected surface water samples at three locations: Meshoppen Creek, both upgradient and downgradient of the Wellsite; and the pond immediately downgradient of the Wellsite. These samples were analyzed for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts. Analytical results from surface water sampling will be evaluated to address the allegation that impacts from the pit could have affected Meshoppen Creek and the nearby pond.

As discussed with PADEP (12/18/09), URS evaluated for releases from the reserve pit that was closed on the pad by advancing two soil test boreholes immediately downgradient of the location of the reserve pit. URS visually examined and logged the subsurface materials for indications of impacts. The samples were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**) for evidence of impacts.

2.12 Ex. 6 - Personal Privacy 6 WELLSITE

As a result of Cabot's additional investigation, interviews with GDS personnel indicated that a drum containing petroleum products and antifreeze was buried at a location on the drill pad and subsequently excavated and removed from the location; however, the excavated drum allegedly contained only a portion of the material present when the drum was buried. This material in the subsurface could potentially enter Meshoppen Creek.

2.12.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 6 Wellsite

URS interviewed multiple GDS employees to evaluate for the location at which the drum was allegedly buried before it was excavated and removed from the Wellsite. Once the burial location was identified, URS excavated a large test pit and collected 12 samples (four at 1-2 ft. bgs, four at the approximate depth of alleged burial of the drum, and four at 1-2 ft. below the approximate depth of alleged burial of the drum). These soil samples were analyzed for a list of parameters consisting of the PA Short List of Petroleum Products (**Appendix A – Table 2**) and ethylene glycol, to evaluate for potential impacts.

URS also collected surface water samples at two locations on Meshoppen Creek, one upgradient and one downgradient of the Wellsite. These samples were analyzed for parameters on the PA Short List of Petroleum Products (**Appendix A – Table 2**). Analytical results from sampling were evaluated to address the concern that the buried drum could potentially have released material both to the subsurface and Meshoppen Creek.

2.13 Ex. 6 - Personal Privacy 7 WELLSITE

Ex. 6 - Personal Privacy Allegation: Ex. 6 - Personal Privacy alleges that the drill pit was not properly closed and that materials continued to ooze out. He expressed concern for sinking into the area where the pit is located and that materials could contaminate Meshoppen Creek.

2.13.1 Approach to Investigate Allegations – Ex. 6 - Personal Privacy 7 Wellsite

URS collected surface water samples at three locations: Meshoppen Creek, both upgradient and downgradient of the Wellsite; and the wetland immediately downgradient of the Wellsite, and analyzed them for the Extended Analytical Suite (**Appendix A – Table 1**) to evaluate for potential impacts. Analytical results from surface water sampling were evaluated to address

the allegation that impacts from the pit could have affected Meshoppen Creek and the nearby wetland.

As discussed with PADEP (12/18/09), URS evaluated for releases from the reserve pit that was closed on the pad by advancing two soil test boreholes immediately downgradient of the location of the reserve pit. URS visually examined and logged the subsurface materials for indications of impacts. The samples were analyzed for the Pit/Frac Analytical Suite (**Appendix A – Table 2**) to evaluate for potential impacts.

3.0 FIELD PROCEDURES

Soil test boreholes to evaluate for impacts from drill pits that are alleged to have been closed improperly were conducted at eight Wellsites and test pit excavations were dug and sampled at seven Wellsites. This assessment included the drilling of 25 soil test boreholes and excavation of 47 test pits.

3.1 SOIL BORING INSTALLATION AND SOIL SAMPLING METHODS

Boreholes were located immediately downgradient of the reserve pit or otherwise as described in **Section 4.0** below. Soil borings were advanced at each of the Wellsites listed below.

- Ex. 6 - Personal Privacy 1H
- 1H/5H/7H SE
- 4/6H
- Ex. 6 - Personal Privacy 2/7H NW
- Gesford 3/9
- Ex. 6 - Personal Privacy 2
- 5
- 6

Boreholes were advanced to a depth of approximately 12 feet bgs, with the uppermost 4 feet being drilled with hollow-stem augers through the Wellsite and the remaining 8 feet being cored using direct push technique. Direct push drilling involves the use of a pneumatic hammer that drives a 4-foot long by 2-inch outside diameter hollow core barrel into the subsurface. A continuous core was collected with dedicated acetate sleeves when drilling with direct push methods. The character of the soil recovered was logged, screened for the presence of VOC using a photo-ionization detector, and the appropriate interval sampled for laboratory analysis. Where no visible impacts were present, the lowermost portion of the borehole was sampled. At a minimum, one soil sample was collected per location, taken below the reported depth of the former drill pit (where impacts from the drill pit would be most likely to occur). The specific methods used at each of the above Wellsites are described in **Section 4.0**.

3.2 TEST PIT INSTALLATION AND SOIL SAMPLING METHODS

Exploratory test pits were excavated at seven Wellsite locations:

- Ex. 6 - Personal Privacy 1H
- 1H/5H/7H SE
- 4/6H
- 2/7H NW
- 3/9
- 2
- 5

Each test pit was excavated with a rubber-tire backhoe to depths of 4 to 5 ft. bgs. Two or three samples were collected within each exploratory test pit. Samples were obtained from excavated material, undisturbed soil, or fill along the sidewall or base of the pit as applicable. Sample intervals were selected to target the materials alleged by Ex. 6 - Personal Privacy to have been affected. Dedicated implements were used to collect each sample. Each test pit was backfilled with the excavated spoil at the completion of sampling.

3.3 SURFACE WATER SAMPLING METHODS

Surface water samples were collected at 13 Wellsites to evaluate water quality both upgradient to and downgradient of purported releases. Samples were collected in association with the following Wellsites:

- Ex. 6 - Personal Privacy 1H
- 1H
- Ex. 6 - Personal Privacy 1
- Ex. 6 - Personal Privacy 1
- 1H/5H/7H SE
- 2
- 4/6H
- Ex. 6 - Personal Privacy 2/7H NW

- [redacted] 3/9
- [redacted] 2
- [redacted] 5
- [redacted] 6
- [redacted] 7

Surface water samples were collected from the stream upgradient to and downgradient from the alleged area of release directly into laboratory supplied containers with the appropriate chemical preservatives for the required analytical methods. Samples were placed in coolers and stored on ice until delivered under chain of custody documentation to the analytical laboratory.

3.4 SAMPLE COLLECTION AND LABORATORY ANALYSIS

Samples were collected in laboratory-supplied containers appropriate for the intended suite of analytical parameters. The aliquots for analysis of volatile organic compounds (VOCs) content were field preserved using US EPA Method 5035. Chemical preservatives, where required for each analytical method, were supplied by the laboratory. Samples were analyzed for one of four analytical suites (Extended Analytical Suite, Pit/Frac Analytical Suite, Diesel Fuel Short List, and Petroleum Short List) based on the nature of the alleged release(s). The analytes in each of the analytical suites are detailed in **Appendix A – Table 1 (water) and Table 2 (soil)**. Sample containers were labeled with a unique sample identification, the time and date of collection, and the sampler's initials. Samples were stored on ice in laboratory-supplied coolers in the possession of the URS professionals until sealed for shipment to the laboratory. Laboratory analyses were contracted to Pace Analytical Laboratories, Inc., of Greensburg, Pennsylvania, a NELAC-certified and PADEP-accredited environmental laboratory.

4.0 SITE ASSESSMENT AND FINDINGS

Descriptions of the specific investigative procedures and findings from each of the Wellsite locations included in this assessment, including location identifications, rationale for selecting each location, and the results of sampling and laboratory analysis at each, are provided in the following sections. Samples were collected using the techniques described in Section 3.0 above. Sample locations were selected based on the nature of the allegations and the appropriate manner to adequately address the purported releases at each individual Wellsite based on the December 18, 2009, Site Visit with Ex. 6 - Personal Privacy and representatives from PADEP, Cabot, Fulbright & Jaworski L.L.P., and URS. In certain circumstances, systematic random sampling was performed in lieu of, or in conjunction with, targeted sampling, to allow for an attainment demonstration under an Act 2 statistical method.

The results of soil sampling were compared to the standards promulgated under Pennsylvania Act 2 (The Land Recycling and Remediation Standards Act, Title 25, Chapter 250 et seq.). URS compared the soil results to the most conservative medium-specific concentration (MSC), which is the Statewide Health Standard (SHS) for Residential-Used aquifer (RU) conditions. The SHS R-U MSC is a conservative, health-based, maximum concentration in soils and groundwater consistent with unrestricted future use for residential purposes, without need for removal of materials and without engineering or institutional controls.

The results of surface water sampling were compared to numerical concentrations from Pennsylvania's surface water quality criteria adopted by PADEP codified in Title 25, Chapter 93, of the Pennsylvania Code. PADEP uses these concentrations to help evaluate whether surface water the State, over time and multiple sampling events and locations, supports existing and designated uses of the water for aquatic life and human activity. The data PADEP uses for this evaluation is collected through a comprehensive monitoring plan that integrates several monitoring designs (e.g., fixed station, intensive and screening-level monitoring, rotating basin, judgmental and probability design) and probability-based networks at the watershed or state level to support statistically valid inferences about the condition of various surface water types, over time. When a surface water sample from a discrete

location at a given point exceeds an surface water quality criteria, it does not necessarily mean that the surface water is impaired for a given use.

The observed range of concentrations of aluminum and iron in surface water samples collected from streams in the vicinity of the Wellsites is consistent with expected variability in sediment and surface water quality for streams near the study area, but removed from oil and gas development activities, as reflected in data collected by the U.S. Geological Survey (USGS). USGS data for total aluminum ranges from not detected at the laboratory reporting limit to 6,600 ug/L. USGS for total iron ranges from not detected at the laboratory reporting limit to 325,000 ug/L. Samples collected as part of this investigation from streams observed concentrations of total aluminum ranging from not detected at the laboratory reporting limit up to 3,110 ug/L and for total iron from not detected at the laboratory reporting limit up to 3,120 ug/L. The observed results do not indicate a release or impacts to streams related to Cabot's drilling activity at any Wellsite.

Concentrations of total aluminum and total iron observed in wetland environments and ponds sampled as part of this investigation observed total aluminum and total iron concentrations that range higher than in the streams sampled, but are still within the anticipated range of concentrations for the pond and wetland environments. In ponds and wetlands, aluminum and iron concentrations often vary widely due to a variety of naturally-occurring detritus and humic material that collects in areas of standing water and variables such as depth, rainfall, use, turbidity, and water chemistry. As discussed in more detail below with respect to each Wellsite, the observed results do not indicate a release or impacts to ponds or wetlands related to Cabot's drilling activity at any Wellsite.

Ex. 6 - Personal Privacy 1H WELLSITE

URS drilled two soil borings, sampled soil from these two boreholes, collected surface water samples at two locations, one from a catchment basin and the other from an outlet from the adjacent pond (both immediately downgradient of the seep area from the Wellsite), and evaluated soil quality in the area at the groundwater seep that exists on the hillside south and below the Ex. 6 - Personal Privacy 1H Wellsite (**Figure 4.1-1**).

4.1.1 Ex. 6 - Personal Privacy 1H Wellsite Soil Boring Installation and Rationale

Two soil borings were drilled and sampled adjacent to the reserve pit. The locations were placed to target the presumed downgradient side as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. **Figure 4.1-2** shows the

locations of the soil borings relative to the reserve pit. One sample was collected from each boring for laboratory analysis of the Pit/Frac suite of constituents (**Appendix A – Table 2**).

4.1.2 Ex. 6 - Personal Privacy 1H Wellsite Surface Soil Sampling and Rationale

URS collected 12 surface soil samples within the area of the seep on the slope below the Wellsite (**Figure 4.1-3**). These samples were analyzed for Target Analyte List (TAL) Metals. Systematic Random Sampling was performed by generating a random sampling grid and sample locations using the PADEP-developed sysrandsamp3dnn.xls spreadsheet program. A copy of the spreadsheet output used in this effort is included in **Appendix B**. Random sampling was performed to allow for an attainment demonstration of an Act 2 standard for the drilling mud release on the Ex. 6 - Personal Privacy 1H Wellsite.

4.1.3 Ex. 6 - Personal Privacy 1H Wellsite Surface Water Sampling and Rationale

Two surface water samples were collected; one at the catchment basin and one at the outlet from the adjacent pond at the base of the slope below the Ex. 6 - Personal Privacy 1H Wellsite (**Figure 4.1-4**). Each sample was submitted for laboratory analysis of the Pit/Frac suite of constituents.

4.1.4 Ex. 6 - Personal Privacy 1H Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for Black 1H soil boring samples are provided on **Table 4.1-1**. A number of metals were present at concentrations above laboratory reporting limits; however, none of those detected were at concentrations in excess of their respective SHS R-U MSCs. Acetone (which is commonly associated with field sample preservation and laboratory handling) was the only VOC detected at a concentration below its SHS R-U MSC. No Semi-Volatile Organic Compounds (SVOCs) were present above laboratory reporting limits.

The analytical results from the 12 systematic random surface soil sample locations from the seep south of the Wellsite are presented on **Table 4.1-2**. Of the 25 metals analyzed, 21 metals were present at concentrations above the laboratory reporting limit. Of these, only arsenic and manganese were detected at a concentrations in excess of their respective SHS R-U MSC, in samples BLK1H-7 and BLK1H-9 for arsenic and BLK1H-6 and BLK1H-9 for manganese. The arsenic and manganese concentrations in samples were less than 10-times their respective residential, used aquifer MSC. Thus, the systematic random sampling

results demonstrate attainment of the SHS R-U MSCs for Target Analyte (TAL) Metals and lithium under the 75%-10X rule (PA Title 25 §250.707(b)(1)(i)), which states that the SHS-R-U is attained when 75% or more of randomly located samples meet their respective SHS and no sample exceeds its SHS by more than ten times.

4.1.5 Ex. 6 - Personal Privacy 1H Wellsite Surface Water Quality Results and Comparison to Standards

Surface water quality sample laboratory results are presented on **Table 4.1-3**. None of the VOCs and SVOCs analyzed were detected above the laboratory reporting limit for any compound in either the downgradient or the side-gradient samples at Ex. 6 - Personal Privacy 1H Wellsite. Total metals analyses identified detectible concentrations of nine metals (aluminum, barium, calcium, iron, magnesium, manganese, potassium, sodium, and zinc). Seven metals were also detected in the dissolved (filtered) portion of the sample (barium, calcium, magnesium, manganese, molybdenum, potassium, and sodium). None of these metals were present at a concentration above the surface water quality criteria except for total aluminum in one of the two downgradient samples (759 ug/L observed vs 750 ug/L surface water quality criteria for aquatic life). Dissolved aluminum in this sample was not detected at the laboratory reporting limit.

The indicator constituents Chloride and TDS were not present at concentrations above their respective surface water quality criteria in either sample. Indicator parameters DRO and MBAS were not detected in either sample. None of the indicator constituents analyzed were detected at a concentration above its respective-surface water ambient water quality criteria.

4.2 Ex. 6 - Personal Privacy 1H WELLSITE

URS sampled soil from each of nine exploratory test pits at the Ex. 6 - Personal Privacy 1H Wellsite (**Figure 4.2-1**). Sampling was performed to evaluate possible impacts from a purported drilling fluids release to the surface on the Wellsite and to the north and northwest. In addition, URS collected surface water samples from the nearby creek located to the north and northeast.

4.2.1 Ex. 6 - Personal Privacy 1H Wellsite Test Pit Excavation and Rationale

Five test pits were excavated and sampled north and east, downhill from the Wellsite, and four were excavated and sampled from the areas immediately to the east and south of the

well head. **Figure 4.2-2** shows the layout of the [redacted] 1H Wellsite and sampling locations. The rationale and purpose for selecting the sampling locations is as follows:

Test Pit ID	Location	Rationale
[redacted]-1H-P1	Behind (upstream of) temporary cofferdam in drainage swale north of Wellsite	Evaluate soil quality where fluid could accumulate
[redacted]-1H-P2	Within constructed swale northeast of Wellsite where fluids were allowed to accumulate for removal	Evaluate soil quality where fluid could migrate
[redacted]-1H-P3	At confluence of drainage from cofferdam and constructed swale	Evaluate soil quality at fluid recovery point
[redacted]-1H-P4	Within constructed swale east of Wellsite	Evaluate soil quality at fluid recovery point
[redacted]-1H-P5	Within constructed swale east of Wellsite	Evaluate soil quality at fluid recovery point
[redacted]-1H-P6	On pad southeast of well head	Evaluate soil quality near location of purported release
[redacted]-1H-P7	On pad east of well head	Evaluate soil quality near location of purported release
[redacted]-1H-P8	On pad southwest of well head	Evaluate soil quality near location of purported release
[redacted]-1H-P9	On pad west of well head	Evaluate soil quality near location of purported release

Each test pit was excavated to approximately 4 ft. bgs. The materials encountered beyond the limit of the Wellsite (in test pits [redacted]-1H-P1 through -P5) consisted of native red silty clay with gravel and cobbles. Materials encountered beneath the Wellsite proper were a mixture of reworked fill and native materials of similar character. Two samples were collected from each test pit; one from 1.5 to 2 ft. bgs and a second from 3.5 to 4 ft. bgs. Each soil sample was submitted for analysis of the Extended Analytical Suite (**Appendix A – Table 2**).

4.2.2 [redacted] 1H Wellsite Surface Water Sampling and Rationale

URS collected surface water samples from the nearby creek located to the north and northeast at the locations shown on **Figure 4.2-3**. Locations were chosen so as to provide water quality data upstream and downstream of the point where the release would have entered the creek. Surface water samples were analyzed for the Extended Analytical Suite (**Appendix A – Table 1**).

4.2.3 Ex. 6 - Personal Privacy 1H Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for Ex. 6 - Personal Privacy 1H soil samples are provided on **Table 4.2-1**. The VOCs 2-butanone, acetone (likely laboratory contaminant), and toluene were detected but at concentrations below their respective SHS R-U MSC in three of the 18 soil samples analyzed (with the exception of acetone a suspected laboratory contaminant). In each case, the VOCs were detected in the near-surface sample but not in the corresponding subsurface sample. A number of TAL Metals were present but none were detected at concentrations above their respective SHS R-U MSCs. No SVOCs were detected above the respective laboratory reporting limits. None of the soil constituents analyzed were detected at a concentration above its respective SHS R-U MSC.

4.2.4 Ex. 6 - Personal Privacy 1H Wellsite Surface Water Quality Results and Comparison to Standards

Surface water quality sample laboratory results are presented on **Table 4.2-2**. None of the VOCs and SVOCs analyzed were detected above the laboratory reporting limit for any compound in either the upstream or downstream sample at the Ex. 6 - Personal Privacy 1H Wellsite. Total metals analyses identified detectible concentrations of eight metals (aluminum, barium, calcium, iron, magnesium, manganese, potassium, and sodium). Seven of these metals were also detected in the dissolved (filtered) portion of the sample (barium, calcium, iron, magnesium, manganese, potassium, and sodium). None of these metals were present at a concentration above the surface water quality criteria. Chloride and TDS were present in both samples but at concentrations below the surface water quality criteria. DRO were not detected in either sample. None of the surface water constituents analyzed were detected at a concentration above the surface water ambient water quality criteria concentration.

4.3 Ex. 6 - Personal Privacy 1 WELLSITE

URS drilled two soil borings and sampled soil from these two boreholes at the Ex. 6 - Personal Privacy 1 Wellsite (**Figure 4.3-1**). In addition, URS collected surface water samples at two locations, one upgradient to, and one downgradient of the Wellsite.

4.3.1 Ex. 6 - Personal Privacy 1 Wellsite Soil Boring Installation and Rationale

The two soil borings were located adjacent to the reserve pit and targeted to the presumed hydraulically downgradient side, as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. **Figure 4.3-2** shows the locations of the soil borings relative to the reserve pit. One sample was collected from each boring for laboratory analysis of the Pit/Frac suite of constituents (**Appendix A – Table 2**).

4.3.2 Ex. 6 - Personal Privacy 1 Wellsite Surface Water Sampling and Rationale

URS collected surface water samples from the nearby creek located to the north and northeast at the locations shown on **Figure 4.3-3**. Locations were chosen so as to provide water quality data upstream and downstream of the point where the release would have entered the creek. Surface water samples were analyzed for the Extended Analytical Suite (**Appendix A – Table 1**).

4.3.3 Ex. 6 - Personal Privacy 1 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for Ex. 6 - Personal Privacy 1 soil samples are provided on **Table 4.3-1**. None of the VOCs or SVOCs or indicator parameters MBAS, ASTM chloride in soil, and ethylene glycol were detected at concentrations above their respective laboratory reporting limits. A number of metals were detected but none were at concentrations above their respective SHS R-U MSCs.

4.3.4 Ex. 6 - Personal Privacy 1 Wellsite Surface Water Quality Results and Comparison to Standards

Surface water quality sample laboratory results are presented on **Table 4.3-2**. None of the VOCs and SVOCs and indicator parameters MBAS, chloride, and ethylene glycol were detected above the laboratory reporting limit for any constituent in either the upstream or downstream sample at Ex. 6 - Personal Privacy 1. Total metals analyses identified detectible concentrations of nine metals (aluminum, barium, calcium, iron, magnesium, manganese, potassium, silver, and sodium). Seven of these metals were also detected in the dissolved (filtered) portion of the sample (barium, calcium, iron, magnesium, manganese, potassium, and sodium). Chloride and TDS were present in both samples but at concentrations below their surface water quality criteria. DRO were not detected in either sample.

No constituent was detected in surface water above its respective surface water quality criteria for human health. No constituent was detected above its respective surface water quality criteria for aquatic life except total aluminum and total iron in an unfiltered, downgradient stream sample (and with respect to total iron, only if it is assumed that the one-time result was representative of the 30-day average—see footnote 4 of Table 4.3-2). Dissolved aluminum was not detected above the laboratory reporting limit, dissolved iron was significantly below the human health criteria concentration, and no other metals or other constituents were detected above their surface water quality criteria as would have been expected to be observed if the aluminum and iron observations were attributable to drilling activities. These results indicate that the observed total aluminum and iron concentrations are associated with sediment collected from the stream. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality in stream samples. They do not indicate impacts related to Cabot's operations at the W. Ex. 6 - Personal Privacy 1 Wellsite.

4.4 Ex. 6 - Personal Privacy 1 WELLSITE

URS drilled two soil borings and sampled soil from these two boreholes at the Ex. 6 - Personal Privacy 1 Wellsite (**Figure 4.4-1**). In addition, URS collected surface water samples at three locations. One sample was collected in a pond downhill of the Wellsite, and two samples were collected in the creek immediately to the east of Ex. 6 - Personal Privacy 1 Wellsite, one upgradient and one downgradient of the Wellsite.

4.4.1 Ex. 6 - Personal Privacy 1 Wellsite Soil Boring Installation and Rationale

The two soil borings were located east of the reserve pit and targeted to the presumed hydraulically downgradient side as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. Borings locations required avoidance of the pipeline immediately east of the reserve pit. **Figure 4.4-2** shows the locations of the soil borings. One sample was collected from each boring for laboratory analysis of the Pit/Frac suite of constituents (**Appendix A – Table 1**).

4.4.2 [Ex. 6 - Personal Privacy] 1 Wellsite Surface Water Sampling and Rationale

The surface water samples were obtained at three locations immediately to the east and north of [Ex. 6 - Personal Privacy] 1 well pad (**Figure 4.4-3**). One sample was collected in the stream upgradient of the Wellsite, one from the pond at the base of the slope immediately northeast of the Wellsite, and the third from the stream downgradient of the Wellsite, and each sample was analyzed for the Extended Analytical Suite (**Appendix A – Table 2**). Locations were selected to evaluate for potential impacts of drilling constituents to the stream and pond.

4.4.3 [Ex. 6 - Personal Privacy] 1 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for [Ex. 6 - Personal Privacy] 1H soil samples are provided on **Table 4.4-1**. With the exception of acetone (which is commonly associated with field sample preservation and laboratory handling), none of the organic constituents analyzed were present at concentrations above its respective laboratory reporting limit. A number of metals were detected; however, arsenic (12.5 mg/kg) was present in one of two samples at a concentration above its SHS R-U MSC (12 mg/kg), which is within the range of naturally-occurring arsenic for soil in the area.

4.4.4 [Ex. 6 - Personal Privacy] 1 Wellsite Surface Water Quality Results and Comparison to Standards

Surface water quality sample laboratory results are presented on **Table 4.4-2**. None of the VOCs, and SVOCs and indicator parameters MBAS and ethylene glycol, were detected above the laboratory reporting limit for any constituent in any of the three samples at the [Ex. 6 - Personal Privacy] 1H Wellsite. Total metals analyses identified detectible concentrations of 12 metals (aluminum, barium, calcium, copper, iron, lead, magnesium, manganese, potassium, sodium, vanadium and zinc). Barium, calcium, iron, magnesium, manganese, potassium and sodium were detected in the dissolved (filtered) portion of the sample. Chloride and TDS were present in both samples but at concentrations below their surface water quality criteria. Petroleum hydrocarbons were not detected in any sample by any of the test methods used.

No constituent was detected in surface water above its surface water quality criteria for human health. No constituent was detected above its surface water quality criteria for aquatic life except total aluminum and total iron in the unfiltered sample from the pond (and with respect to total iron, only if it is assumed that the one-time result was representative of

the 30-day average). Dissolved aluminum was not detected above the laboratory reporting limit, dissolved iron was below the human health concentration, and no other metals or other constituents exceeded their surface water quality criteria as would be expected to be observed if attributable to drilling activities. These results indicate that the observed aluminum and iron concentrations are associated with sediment collected from the pond. Concentrations of total aluminum and total iron observed in wetland environments and ponds in the vicinity of the Wellsite sampled as part of this investigation observed total aluminum and total iron within the anticipated range of concentrations for the pond and wetland environments. In ponds and wetlands, aluminum and iron concentrations often vary widely and range higher than in streams due to a variety of naturally-occurring detritus and humic material that collects in areas of standing water and variables such as depth, rainfall, use, turbidity, and water chemistry. The aluminum and iron observations do not indicate impacts related to Cabot's operations at the Ex. 6 - Personal Privacy 1 Wellsite

4.5 Ex. 6 - Personal Privacy 1H/5H/7H SE WELLSITE

URS drilled four soil borings, excavated four exploratory test pits, and sampled soil from each at the [redacted] 1H/5H/7H SE Wellsite. Sampling was performed to evaluate for possible impacts from purported releases of drilling fluids and a purported release of diesel fuel to the surface on the Wellsite. The location of the [redacted] 1H/5H/7H SE Wellsite is presented on **Figure 4.5-1**.

4.5.1 [redacted] 1H/5H/7H SE Wellsite Soil Boring Installation and Rationale

The four soil borings were located adjacent to the reserve pit and targeted to the topographic and presumed hydraulically downgradient side, as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. Borings B2 and B3 were located at the eastern edge of the Wellsite between the reserve pit and the steep slope formed by the filled edge of the Wellsite. Borings B1 and B4 were located at the southern and northern ends, respectively, of the reserve pit. **Figure 4.5-2** shows the locations of the soil borings relative to each reserve pit.

The materials encountered included reworked native silt, clay gravel and cobble placed to level the Wellsite area. Borings were advanced to a depth of about 12-13 ft. bgs. One sample was collected from each boring for laboratory analysis of the Pit/Frac suite of constituents (**Appendix A – Table 2**).

4.5.2 [redacted] 1H/5H/7H SE Wellsite Test Pit Excavation and Rationale

The four test pit locations were selected to target the area immediately east of the Ely 1H well and south of the [redacted] 5H well where the diesel fuel release from the drilling rig purportedly occurred. **Figure 4.5-2** shows the locations of the test pits evacuated at the [redacted] 1H/5H/7H SE Wellsite.

Each test pit was excavated to approximately 4 ft. bgs. The materials encountered consisted cobble and boulder fill with reworked native soil. Two samples were collected from each test pit; one from 1.5 to 2 ft. bgs and a second from 3.5 to 4 ft. bgs. Each soil sample was submitted for analysis of the PA Short List for Diesel (**Appendix A – Table 2**).

One sample ([redacted]-5-P2B) was collected in with a field duplicate ([redacted]-5-P2C) for quality assurance purposes.

4.5.3 [redacted] 1H/5H/7H SE Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for Ely 1H/5H/7H SE Wellsite soil samples from soil test boreholes are provided on **Table 4.5-1**. None of the metals detected were present at concentrations above their respective SHS R-U MSCs. The only VOCs and SVOCs detected, 2-butanone, toluene, and m- and p-cresols, were present at concentrations below their respective SHS R-U MSC. Acetone was detected in each soil boring sample below its SHS R-U MSC; however, acetone is a common laboratory contaminant. Indicator parameters ASTM chloride in soil and MBAS were present above their respective laboratory reporting limit concentration in one (B3) of the four soil boring samples.

The results of test pit soil quality analyses for [redacted] 1H/5H/7H SE Wellsite soil boring samples are provided on **Table 4.5-2**. The eight test pit samples (plus one duplicate) analyzed for PA Short List for Diesel did not identify the presence of any constituent above their respective SHS R-U MSCs.

4.5.4 [redacted]1H/5H/7H SE Wellsite Hillside Reconnaissance

URS personnel traversed the hillside to the east of (and below) the Wellsite for evidence of groundwater seeps or springs that could provide evidence of discharges from the reserve pit or other drilling operations. Four traverse lines oriented parallel to the eastern edge of the Wellsite were walked by two URS professionals. Traverses were spaced approximately 100 to 150 feet apart with each professional taking a different path along the traverse. Outcrops and low areas along the hillside were closely inspected for evidence of groundwater seepage. URS did not observe any areas where groundwater was discharging to the surface.

4.6 [redacted]2 WELLSITE

URS drilled two soil borings and sampled soil from these two boreholes at the [redacted]2 Wellsite (**Figure 4.6-1**). In addition, URS collected surface water samples at two locations.

4.6.1 [redacted]2 Wellsite Soil Boring Installation and Rationale

The two soil borings were located adjacent to the reserve pit and targeted to the presumed hydraulically downgradient side as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. **Figure 4.6-2** shows the locations of the soil borings relative to the reserve pit. One sample was collected from each boring for laboratory analysis of the Pit/Frac suite of constituents (**Appendix A – Table 2**).

4.6.2 [redacted]2 Wellsite Surface Water Sampling and Rationale

URS collected two surface water samples in the vicinity of the [redacted]2 Wellsite. One sample was collected from the spring located upgradient of the Wellsite and the second sample was collected from the creek formed by the spring, downgradient of the Wellsite and immediately to the east-southeast of [redacted]2 Wellsite (**Figure 4.6-3**). Samples were analyzed for the Pit/Frac suite of constituents (**Appendix A – Table 1**).

4.6.3 [redacted]2 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for [redacted]2 soil samples are provided on **Table 4.6-1**. The VOCs acetone (a common laboratory contaminant) and 2-butanone were present at concentrations below their respective SHS R-U MSCs. A number of metals were present but

at concentrations below their respective SHS R-U MSCs with the exception of arsenic, which was observed at concentrations above the SHS R-U MSC, but within the range of naturally occurring background concentrations observed in the area. Indicator parameters ASTM chloride in soil, MBAS, and ethylene glycol were not detected at their respective laboratory reporting limits.

4.6.4 [redacted] 2 Surface Water Quality Results and Comparison to Standards

Surface water quality sample laboratory results are presented on **Table 4.6-2**. The indicator parameter MBAS, along with the VOCs and SVOCs analyzed were not detected above their respective laboratory reporting limit for any constituent in any of the three samples at the Ely 2/5H Wellsite. Total metals analyses identified detectible concentrations of 11 metals (aluminum, barium, cadmium, calcium, iron, lead, magnesium, manganese, potassium, sodium, and zinc). Barium, calcium, magnesium, manganese, potassium, and sodium were detected in the dissolved (filtered) portion of the sample. Chloride and TDS were not detected at concentrations above the respective human health surface water quality criteria in either sample. DRO were not detected in any sample by any of the test methods used. None of the surface water chemistry parameters analyzed were detected at a concentration above its respective surface water quality criteria, except for aluminum and iron in the downstream stream sample, as discussed below.

No constituent was detected in surface water above the surface water quality criteria for human health for the constituent. No constituent was detected above its surface water quality criteria for aquatic life except total aluminum and total iron in the unfiltered downgradient stream sample. Aluminum and iron were not detected at the laboratory reporting limit and no other constituents exceeded the surface water quality criteria as total recoverable, as would have been expected to be observed if these results were attributable to drilling activities. These results indicate that the observed total aluminum and total iron concentrations are associated with sediment collected from the stream. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality. They do not indicate impacts related to Cabot's operations at the Ely 2 Wellsite.

4.7 [redacted] 4/6H WELLSITE

URS sampled soil from each of seven exploratory test pits excavated at the [redacted] 4/6H Wellsite (**Figure 4.7-1**). Sampling was performed to evaluate for potential impacts from a purported

hydrofracturing fluid release to the surface and to the north and northwest of the Wellsite. Two surface water samples were also collected and analyzed; one from the [redacted] Spring House and one from the adjacent Pond.

4.7.1 [redacted] 4/6H Wellsite Test Pit Excavation and Rationale

Four soil test pits were targeted to the areas on and immediately northwest of the Wellsite, and three were excavated and sampled further downhill from the Wellsite toward the northeast (**Figure 4.7-2**). The rationale for selecting the sampling locations is as follows:

Test Pit ID	Location Rationale	Purpose
[redacted]-4-P1	Northwest of well ELY 4 near the northwestern edge of the Wellsite	Evaluate soil quality nearest location of purported release
[redacted]-4-P2	North-northwest of well ELY 4 near the northwestern edge of the Wellsite	Evaluate soil quality nearest location of purported release
[redacted]-4-P3	Immediately west of the Wellsite in a drainage swale that originates near the western edge of the Wellsite	Evaluate soil quality where fluid could migrate
[redacted]-4-P4	North of the Wellsite immediately downhill from well ELY 6	Evaluate soil quality immediately downslope from location of purported release
[redacted]-4-P5	Immediately west of the Wellsite in a drainage swale that originates near the western edge of the Wellsite, 50 feet northeast of ELY-4-P3	Evaluate soil quality where fluid could migrate
[redacted]-4-P6	North of the Wellsite immediately downhill from well ELY 6	Evaluate soil quality immediately downslope from location of purported release
[redacted]-4-P7	Low point in drainage swale near Ely driveway	Evaluate soil quality where fluid could accumulate

Each test pit was excavated to approximately 4 ft. bgs. The materials encountered beyond the limit of the Wellsite (at pits [redacted]-4-P3, [redacted]-4-P5 and [redacted]-4-P7) consisted of native red silty clay with gravel and cobbles. The materials encountered beneath the Wellsite proper (pits [redacted]-4-P1 and [redacted]-4-P2) and in the fill slope to the northeast (pits [redacted]-4-P4 and [redacted] 4-P6) was a mixture of cobble and boulder fill with reworked native soil. Two samples were collected from each test pit; one from 1.5 to 2 ft. bgs and a second from 3.5 to 4 ft. bgs. Each soil sample was submitted for analysis of the Extended List of constituents (**Appendix A – Table 2**).

One sample [redacted]-4-P3B) was collected with a field duplicate ([redacted]-4-P3C) for quality assurance purposes.

4.7.2 [redacted]4/6H Wellsite Surface Water Sampling and Rationale

URS collected two surface water samples: one from the groundwater spring located near the [redacted] residence and the second from the pond itself, downgradient of the Wellsite and approximately 200 feet to the north and east of [redacted] 4/6H Wellsite (**Figure 4.7-3**). Samples were analyzed for the Extended List of constituents (**Appendix A – Table 1**).

One sample [redacted]-DW Seep) was collected with a field duplicate (Ely-DW Seep-D) for quality assurance purposes.

4.7.3 [redacted]4/6H Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for [redacted] 4/6H Wellsite test pit soil samples are provided on **Table 4.7-1**. The VOCs acetone (which is commonly associated with field sample preservation and laboratory handling), 2-butanone, carbon disulfide, ethylbenzene, p-isopropyltoluene, and toluene were present but at concentrations below their respective SHS R-U MSCs. Arsenic was detected at concentrations above its SHS R-U MSC in nine of the 15 samples analyzed, with a maximum observed concentration of 35.9 mg/kg, which is within the range of naturally-occurring arsenic for soil in the area. The indicator parameter DRO was detected in five samples from test pits P1 through P4 (nearest the Wellsite). DRO is not regulated so comparison to standards is made using the PA Short List for Diesel. No constituents were present above their respective SHS R-U MSCs. The indicator parameters MBAS and ethylene glycol were not detected above their laboratory reporting limits.

4.7.4 [redacted]4/6H Wellsite Surface Water Quality Results and Comparison to Standards

Surface water quality sample laboratory results are presented on **Table 4.7-2**. None of the VOCs and SVOCs or indicator parameters MBAS and DRO were detected above the laboratory reporting limit for any constituent in any of the three samples (two discrete and one duplicate) at [redacted] 4/6H Wellsite. Total metals analyses identified detectible concentrations of ten metals (aluminum, barium, calcium, copper, iron, magnesium, manganese, potassium, silver, and sodium) in the [redacted] pond water. Barium, calcium,

magnesium, manganese, potassium, and sodium were detected in the dissolved (filtered) portion of that sample. All of these metals/constituents were detected below surface water quality criteria and present no threat. Chloride and TDS were present in both samples but at concentrations below their surface water quality criteria. Similar compounds were detected for the [redacted]DW seep. DRO were not detected in any sample by any of the test methods used. The pH of the Ely Pond sample and the [redacted] drinking water seep were 5.8 and 5.6 respectively, below the ambient surface water quality criteria range. For all other constituents, none of the surface water constituents analyzed were detected at a concentration above its respective surface water quality criteria .

4.8 [redacted] 2/7H NW WELLSITE

URS sampled soil from each of 16 exploratory test pits at the [redacted] 2/7H NW Wellsite (**Figure 4.8-1**). Sampling was performed to evaluate for possible impacts from purported releases of hydro-fracturing fluid and diesel fuel to the surface on the Wellsite.

4.8.1 [redacted] 2/7H NW Wellsite Test Pit Excavation and Rationale

Two of the test pits excavated at the [redacted] 2/7H NW Wellsite were targeted to the low area near the southeastern corner of the pad and the remaining 14 pits were located using the Systematic Random Sampling Workbook developed by PADEP to minimize sampling bias, increase the likelihood that any remaining impacts are identified, and to provide a basis for attainment of an Act 2 standard (**Figure 4.8-2**). A copy of the Random Sampling Workbook used to select test pit locations is included in **Appendix B**.

Test Pit ID	Location Rationale	Purpose
G-7-P1	Targeted to southeastern corner of Wellsite beyond edge of southern reserve pit	Evaluate soil near topographic low on Wellsite
G-7-P2	Targeted to east-southeastern edge of Wellsite beyond edge of eastern reserve pit	Evaluate soil near topographic low on Wellsite
G-7-P3	Random location at grid coordinate (217.8, 20.6)	Evaluate soil quality across Wellsite without sampling bias
G-7-P4	Random location at grid coordinate (222.7, 59.3)	Evaluate soil quality across Wellsite without sampling bias
G-7-P5	Random location at grid coordinate (225.5, 89.3)	Evaluate soil quality across Wellsite without sampling bias

Test Pit ID	Location Rationale	Purpose
G-7-P6	Random location at grid coordinate (221.1, 101.0)	Evaluate soil quality across Wellsite without sampling bias
G-7-P7	Random location at grid coordinate (189.6, 90.0)	Evaluate soil quality across Wellsite without sampling bias
G-7-P8	Random location at grid coordinate (164.0, 63.4)	Evaluate soil quality across Wellsite without sampling bias
G-7-P9	Random location at grid coordinate (132.5, 7.2)	Evaluate soil quality across Wellsite without sampling bias
G-7-P10	Random location at grid coordinate (79.2, 21.6)	Evaluate soil quality across Wellsite without sampling bias
G-7-P11	Random location at grid coordinate (39.0, 53.7)	Evaluate soil quality across Wellsite without sampling bias
G-7-P12	Random location at grid coordinate (71.8, 85.3)	Evaluate soil quality across Wellsite without sampling bias
G-7-P13	Random location at grid coordinate (18.9, 88.9)	Evaluate soil quality across Wellsite without sampling bias
G-7-P14	Random location at grid coordinate (15.1, 31.7)	Evaluate soil quality across Wellsite without sampling bias
G-7-P15	Random location at grid coordinate (11.9, 7.4)	Evaluate soil quality across Wellsite without sampling bias
G-7-P16	Random location at grid coordinate (12.4, 79.7)	Evaluate soil quality across Wellsite without sampling bias

Each test pit was excavated to approximately 4 ft. bgs. The materials encountered consisted of fill material comprised of a mixture of native red silty clay with gravel, cobble and boulders and native glacial till beneath a veneer of gravel. The test pits along the extreme eastern edge of the Wellsite encountered fill to 4 ft. bgs, consisting of cobble and boulders with minor silt and clay. Two samples were collected from each test pit; one from 1.5 to 2 ft. bgs and a second from 3.5 to 4 ft. bgs. Each soil sample was submitted for analysis of the Pit/Frac Suite of parameters (**Appendix A – Table 2**).

One sample (G-7-P11B) was collected with a field duplicate (G-7-P11c) for quality assurance purposes.

4.8.2 Ex. 6 - Personal Privacy 2/7H NW Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for Gesford 2/7H NW Wellsite soil samples are provided on **Table 4.8-1**. The VOCs acetone (which is commonly associated with field sample preservation and laboratory handling), 1,2,4-trimethylbenzene, carbon disulfide, and tetrachloroethene were present at concentrations below their respective SHS R-U MSCs. With the exception of acetone, the VOCs detected were limited to five samples from three of the 16 test pits excavated and sampled. None of the SVOCs analyzed were detected at concentrations above their respective SHS R-U MSCs. Arsenic was detected at concentrations above its SHS R-U MSC in 28 of the 33 samples analyzed, with a maximum observed concentration of 42.6 mg/kg, which is within the range of naturally-occurring arsenic for soil in the area. The other metals detected were not present at concentrations above their respective SHS R-U MSCs in any sample. Indicator parameters MBAS and ASTM chloride in soil were detected at low concentrations in one and seven, respectively, of the 33 samples analyzed and present no threat at these levels.

4.9 Ex. 6 - Personal Privacy 3/9 WELLSITE

URS drilled five soil borings, sampled soil from these five boreholes, and excavated and sampled soil from each of six test pits at this Wellsite (**Figure 4.9-1**). Two surface water samples were collected from the unnamed tributary to Meshoppen Creek immediately to the east and southeast, one upstream and the second downstream of the Wellsite (**Figure 4.9-3**).

4.9.1 Ex. 6 - Personal Privacy 3/9 Wellsite Soil Boring Installation and Sampling

The five soil borings were oriented so as to evaluate for potential presence of released fluids in the fill material on which the pad is built. Four borings were located to target the presumed hydraulically downgradient side of the Wellsite to evaluate for fluid movement toward the stream to the southeast. The fifth boring was located near the Ex. 6 - Personal Privacy 3V well to evaluate subsurface soil quality near the purported release associated with the drilling of this well.

4.9.2 [Ex. 6 - Personal Privacy]3/9 Wellsite Test Pit Excavation and Rationale

URS sampled soil from each of six exploratory test pits at the [Ex. 6 - Personal Privacy] 3/9 Wellsite. The locations of the [Ex. 6 - Personal Privacy] 3/9 test pits are shown on **Figure 4.9-2**. Sampling was performed to evaluate for possible impacts from a release of diesel fuel to the surface on the Wellsite. The test pits were located to target the area immediately east of the [Ex. 6 - Personal Privacy] 9V well where the drilling rig sat and where the diesel tank release purportedly occurred. Each of the six test pit locations were selected to evenly distribute samples across the areas where residual diesel impacts would most likely still have been present if the purported release had, in fact, occurred where alleged.

Two test pits encountered the tops of the former reserve pits at the intended locations (G-3-P5 and G-3-P6). The former reserve pits were identified by the presence of a black heavy gauge plastic liner at approximately 2 ft. bgs. These two test pits were immediately abandoned and subsequently relocated as described below.

An odor was noted on the soil in test pit G-3-P1, so the two relocated test pits were installed to the south and west of pit G-3-P1 to delineate, in conjunction with the other test pits, all four sides of that location. Two samples were collected from fill material in each test pit; one from 1.5 to 2 ft. bgs and a second from 3.5 to 4 ft. bgs. Each soil sample was submitted for analysis of the Pennsylvania Short List for Diesel (**Appendix A – Table 2**).

4.9.3 [Ex. 6 - Personal Privacy]3/9 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for Gesford 3/9 Wellsite soil boring samples are provided on **Table 4.9-1**. The VOCs acetone (which is commonly associated with field sample preservation and laboratory handling), 2-butanone, and carbon disulfide were present but at concentrations below their respective SHS R-U MSCs. None of the SVOCs analyzed were detected at concentrations above their respective SHS R-U MSCs. Manganese was detected in one sample at a concentration above the SHS R-U MSC. Arsenic was detected at concentrations above its SHS R-U MSCs in each of the five samples analyzed, with concentrations ranging from 15.2 mg/kg to 35.6 mg/kg, which is within the range of naturally-occurring arsenic for soil in the area. The other metals detected were not present at concentrations above their respective SHS R-U MSCs in any sample. Indicator parameters MBAS, ethylene glycol, and ASTM chloride in soil were not detected in any of the samples analyzed at concentrations above their respective laboratory reporting limit.

The results of soil quality analyses for Ex. 6 - Personal Privacy 3/9 test pit samples are provided on **Table 4.9-2**. Test pit soil samples identified the diesel fuel constituents ethylbenzene, cumene, naphthalene, toluene, 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene at concentrations above the laboratory reporting limit in both samples from test pit G-3-P1. Each of these compounds was detected at concentrations below their SHS R-U MSCs. Regulated diesel fuel constituents were not detected at concentrations above their SHS R-U MSCs in any of the other ten soil samples analyzed.

4.9.4 Ex. 6 - Personal Privacy 3/9 Wellsite Surface Water Quality Results and Comparison to Standards

The results of surface water quality analyses for Gesford 3/9 water samples are provided on **Table 4.9-3**. Total metals analyses identified detectible concentrations of eight metals (aluminum, barium, calcium, iron, magnesium, manganese, potassium, and sodium). Barium, calcium, iron, magnesium, manganese, potassium, and sodium were detected in the dissolved (filtered) portion of the sample. Chloride and TDS were present in both samples at concentrations below their surface water quality criteria. None of the surface water constituents analyzed were detected at a concentration in excess of its respective surface water ambient water quality criteria.

4.9.5 Summary of Reports Detailing Remediation of Releases at the Ex. 6 - Personal Privacy 3/9 Wellsite

Three releases of diesel fuel at the Ex. 6 - Personal Privacy 3V/V9 Wellsite were investigated by Cabot as detailed below. These findings are not part of the assessments made in response to Mr. Ely's allegations but were undertaken during this phase of assessment for completeness due to the other work performed at this Wellsite as described in the previous section.

January 30, 2009 Release

On Friday January 30, 2009 at about 5:00 AM, a fitting failed on the fuel supply line that extended from the end of the worker trailer diesel fuel tank to a portable generator, releasing diesel to the surface of the drill pad. The release lasted for a period of about 10 minutes and site personnel estimated that about 75 gallons of diesel fuel was released to the surface of the drill pad that was covered in snow and ice at the time. The diesel fuel impacted an area

about 10' x 10' behind the trailer and about 5' x 20' at the side of the trailer. The extent of impact was limited due primarily to the short duration of the release (time between the failure of the fitting and subsequent control of the release) and the fact that the ground was frozen and covered with snow and ice. Therefore, the diesel had no opportunity to impact the subsurface.

Oil soaks were put down immediately after the spill was detected to soak up as much diesel fuel as possible. GDS then removed all visually impacted snow and ice plus an additional 1/2 inch of surface material from the top of the drill pad via backhoe. The impacted material was placed in a dumpster and subsequently disposed by Diaz Disposal, LLC at the Keystone Sanitary Landfill. Eight test pits were excavated to a depth of about 3 feet bgs to evaluate subsurface conditions and to allow sampling at the 0.5 – 1 foot ft. bgs interval in the area of the spill. Each pit was sampled at 0.5 – 1 ft. bgs and the samples were analyzed for the PA Short List for Diesel Products. Analytical results for the eight samples collected indicate the remediation effort successfully attained the SHS R-U MSCs for all constituents on the PA Short List for Diesel Products.

This information was summarized in a report prepared by URS dated August 28, 2009 that was transmitted to the PADEP on September 16, 2009.

August 19, 2009 Release and August 21, 2009 Report of Diesel Odors From Soil at the Southeast Corner of the Wellsite

On August 19, 2009, a tank was overfilled with diesel fuel. On-site personnel estimated the release to be about 60 gallons; however, the NOV issued by PADEP dated August 21, 2009 identified the release to be about 100 gallons. The diesel was released directly to the well pad and traveled north-northwest on the well pad. Migration of the released diesel was controlled using absorbent mats and booms. Impacted soil was excavated from the impacted area and staged on the well pad.

On August 21, 2009, PADEP received a complaint concerning a petroleum odor originating from soil off the southeast corner of the well pad. PADEP inspected the area on August 21, 2009 and determined that petroleum products were present in the soil. Shortly afterward,

Cabot excavated shallow soils from this area and staged them on the well pad for characterization and disposal.

The results of confirmational sampling at both locations, conducted by Resource Environmental Management, Inc., demonstrated attainment of the SHS R-U MSCs for all constituents on the PA Short List for Diesel Products. This information was summarized in a report prepared by Environmental Resource Management, Inc. dated October 27, 2009 that was submitted to PADEP. Cabot received Relief From Further Remediation Liability Protection under Act 2 for both of the August 2009 releases.

4.10 [redacted] 2 WELLSITE

URS installed two soil borings and four exploratory test pits and sampled soil from each at the [redacted] 2 Wellsite (**Figure 4.10-1**). URS collected surface water samples at three locations from the creek immediately to the east of [redacted] 2 Wellsite, on each upgradient and downgradient of the Wellsite and one from the pond immediately to the east.

4.10.1 [redacted] 2 Wellsite Soil Boring Installation and Rationale

The two soil borings were located adjacent to the reserve pit and targeted to the presumed hydraulically downgradient side as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. **Figure 4.10-2** shows the locations of the soil borings relative to each reserve pit.

4.10.2 [redacted] 2 Wellsite Test Pit Excavation and Rationale

Since there was no visual evidence of stressed vegetation or hydrocarbon odors noted when traversing the Wellsite and slope, test pit locations were targeted at regular intervals along the reclaimed sides of the Wellsite. The test pits were situated with three test pits excavated into the western face of the reclaimed high wall (the long axis of the Wellsite) and one test pit excavated into the southern face. The locations of the [redacted] 2 test pits are shown on **Figure 4.10-2**.

Each test pit was excavated both downward and inward into the reclaimed slope to depths of 4 to 5 ft. bgs. The material excavated was a mixture of reworked fill consisting of cobbles

and boulders mixed with native red silty clay and gravel. Two samples were collected from each test pit: one from 1.5 to 2 ft. bgs and a second from 3.5 to 4 ft. bgs. Each sample was submitted for analysis of the PA Short List for Diesel (**Appendix A – Table 2**).

One sample ([redacted]-2-P1A) was collected with a field duplicate ([redacted]-2-P1C) for quality assurance purposes.

4.10.3 [redacted] 2 Wellsite Surface Water Sampling and Rationale

URS collected three surface water samples for the Lewis 2 Wellsite: an upgradient sample that also serves as the downgradient [redacted] 1H Wellsite surface water sample, one from the pond near the base of the slope below the northeastern side of Lewis 2 Wellsite, and a downgradient sample from the confluence of Burdick Creek with Meshoppen Creek (**Figure 4.10-3**). Samples were analyzed for the Extended List of constituents (**Appendix A - Table 1**).

4.10.4 [redacted] 2 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for the [redacted] 2 Wellsite soil boring samples are provided on **Table 4.10-1**. None of the organic constituents analyzed were present at concentrations above laboratory reporting limits except for acetone (which is a common laboratory contaminant). A number of metals were detected; however, none of those detected were at concentrations above their respective SHS R-U MSCs. Indicator parameters ASTM chloride in soil, MBAS, and ethylene glycol were likewise not detected above the laboratory reporting limits.

The results of test pit soil quality analyses are summarized on **Table 4.10-2**. None of the constituents on the PA Short List for Diesel analyzed were detected at concentrations above their respective SHS R-U MSCs.

4.10.5 [redacted] 2 Wellsite Surface Water Quality Results and Comparison to Standards

The results of surface water quality analyses for [redacted] 2 Wellsite surface water samples are provided on **Table 4.10-3**. Total metals analyses identified detectible concentrations of 17 metals in the pond sample, while the stream samples identified only aluminum, barium,

calcium, iron, magnesium, manganese, potassium, and sodium above the laboratory reporting limits. The dissolved (filtered) portions of the three samples identified detectible concentrations of barium, calcium, iron, magnesium, manganese, potassium, and sodium only. None of the metals detected in either the filtered and unfiltered samples were present at concentrations above the surface water quality criteria for the constituent. Chloride and TDS were detected in each of the three samples but at concentrations below the surface water quality criteria. VOCs, SVOCs, and DRO were not detected above the laboratory reporting limits in any sample by any of the test methods used.

None of the surface water constituents analyzed in any sample collected from any location in the vicinity of the Wellsite were detected at a concentration above the human health based surface water quality criteria for human health. No surface water constituents analyzed were detected in either the upgradient or downgradient stream samples at a concentration above the surface water quality criteria for aquatic life. In the sample from the pond, total aluminum and total iron was detected above the surface water quality criteria for aquatic life. Aluminum and iron were not detected in the dissolved phase in any sample, and no other constituent was detected above its surface water quality criteria for any sample. These results indicate that total aluminum and total iron are associated with sediment collected from the pond. Concentrations of total aluminum and total iron observed in the vicinity of the Wellsite are within the anticipated range of concentrations for the pond and wetland environments. In ponds and wetlands, aluminum and iron concentrations often vary widely and range higher than in streams due to a variety of naturally-occurring detritus and humic material that collects in areas of standing water and variables such as depth, rainfall, use, turbidity, and water chemistry. The concentrations of aluminum and iron observed in the pond do not indicate releases or water quality impacts related to Cabot's operations at the Lewis 2 Wellsite.

4.11 Ex. E - Personal Privacy 5 WELLSITE

URS drilled two soil borings and collected soil samples from these two soil boreholes at the Teel 5 Wellsite (**Figure 4.11-1**). In addition, URS collected surface water samples from three locations.

4.11.1 [redacted] 5 Wellsite Soil Boring Locations and Rationale

The two soil borings were located adjacent to the reserve pit and targeted to the topographic and presumed hydraulically downgradient side, as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. **Figure 4.11-2** shows the locations of the soil borings relative to the reserve pit.

4.11.2 [redacted] 5 Wellsite Surface Water Sampling Locations and Rationale

URS collected surface water samples at three locations to evaluate water quality in areas where purported releases would be expected to result in impacts and in areas removed from potential impacts from the Wellsite to provide comparison to background conditions (**Figure 4.11-3**). Surface water samples were collected: (1) in Meshoppen Creek upgradient (Teel 5-A) and downgradient ([redacted] 5-C) of the Wellsite, and (2) in Meshoppen Creek immediately downslope from the [redacted] 5 Wellsite (Teel 5-B).

4.11.3 [redacted] 5 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for the [redacted] 5 soil samples are provided on **Table 4.11-1**. None of the organic constituents analyzed were present at concentrations above laboratory reporting limits except for acetone (probable laboratory contaminant). A number of metals were present but at concentrations below their respective SHS R-U MSCs. Indicator parameters ASTM chloride in soil, MBAS, and ethylene glycol were not detected in either soil sample above the laboratory reporting limits.

4.11.4 [redacted] 5 Wellsite Surface Water Quality Results and Comparison to Standards

The results of surface water quality analyses for the [redacted] 5 Wellsite water samples are provided on **Table 4.11-2**. Total metals analyses identified detectible concentrations of eight metals (aluminum, barium, calcium, iron, magnesium, manganese, potassium, and sodium) in the three samples. The dissolved (filtered) portions of the three samples identified detectible concentrations of barium, calcium, iron, magnesium, manganese, potassium, and sodium only. None of the metals detected in either the filtered and unfiltered samples were present at concentrations above the surface water quality criterias for the constituent. Chloride and TDS were detected in each of the three samples but at concentrations below their respective surface water quality criteria. VOCs and SVOCs were not detected above

the laboratory reporting limits in any of the surface water samples. The indicator parameter DRO was detected above the laboratory reporting limits in the upgradient sample but not in either of the other two (downgradient) Teel 5 Wellsite surface water samples.

4.11.5 Summary of Reports Detailing Remediation at the Teel 5 Wellsite

Two releases of diesel fuel at the Teel 5 Wellsite were investigated by Cabot as detailed below. These findings are not part of the assessments made in response to Mr. [redacted] allegations but were undertaken during this phase of assessment for completeness due to the other work performed at this Wellsite as described in the previous section.

June 3, 2008 Release

On June 3, 2008 at about 6:00 AM, the GasSearch Drilling Services Company (GDS) drilling crew found a fuel line leaking on the drill pad of Teel 5 Wellsite. Diesel had covered part of the well pad, and was releasing from the pad, down the hillside (and into the ground surface), seeping from the hillside into a drainage ditch along Herb Button Road, flowing into a culvert under the road, and onto a hillside that drained to a flooded area created by a beaver activity (dams). Interim remedial measures were implemented to contain the release and recover free product. Absorbent materials were placed on the impacted area by the crew. About 700 gallons of diesel was recovered within 2 days of the release.

Two applications of Petrox® & water mixture consisting of activated microbes as bioaugmentation of naturally occurring microbes and nutrients to promote microbial activity and lime were applied on the impacted areas. The seep area of the drill pad was excavated and potentially impacted soil was visually evaluated and sampled to evaluate for diesel constituents during Wellsite recovery and restoration. Soil samples were collected, analyzed, and evaluated for attainment with Act 2 cleanup standards. The results indicated the cleanup attained compliance with the SHS R-U MSCs for all constituents on the PA Short List for Diesel Products.

This information was summarized in a report prepared by URS dated November 3, 2009 that was submitted to PADEP. Cabot received Relief From Further Remediation Liability Protection under Act 2 for this release.

4.12 TEEL 6 WELLSITE

URS collected 13 soil samples from one over-excavated test pit at the Teel 6 Wellsite (**Figure 4.12-1**). In addition, URS collected surface water samples at two locations on Meshoppen Creek.

4.12.1 Teel 6 Wellsite Test Pit Excavation and Rationale

URS collected soil samples from within a large exploratory test pit at the Teel 6 Wellsite (**Figure 4.12-2**). Sampling was performed to evaluate for potential impacts from a 55-gallon drum that had been buried on this Wellsite and subsequently excavated and removed from this Wellsite.

The approximate locations for test pit excavation and soil sampling were provided by a former GDS employee. Excavations in these areas encountered bedrock within 1 ft. bgs. After discussions with another GDS employee who was present when the drum was excavated, it was decided to attempt digging approximately 20 feet south of the original (reported) locations. The GDS employee further indicated that the drum was encountered between 4.5 and 5.5 ft. bgs within a lined drainage swale. This excavation encountered fill in an abandoned drainage channel. This exploratory test pit was enlarged to evaluate the character of the fill and identify the edges of the abandoned drainage channel. Black plastic used to line the abandoned drainage channel was encountered between 6 and 7 ft. bgs. Based on the accuracy of the information provided by the GDS employee and the presence of the plastic liner, it was decided that this second test pit had been installed in the correct location to evaluate for potential releases from the buried drum.

The exploratory test pit was over-excavated to a final dimension of approximately 8 feet wide by 12 feet long, oriented in a general north-south direction (parallel to the top of the slope). Due to the enlarged size of this test pit, samples were obtained from each of the four sidewalls rather than extending the pit further or excavating at a greater distance, which may have removed potentially impacted materials. Three samples were obtained from each sidewall as follows:

Test Pit ID	Location Rationale	Purpose
TEEL-6-P1	Southern sidewall at 2, 5, and 6 ft. bgs	Evaluate soil quality near the surface, at, and below the purported depth of the buried drum, respectively
TEEL-6-P2	Eastern sidewall at 2, 4, and 6 ft. bgs	Evaluate soil quality near the surface, at, and below the purported depth of the buried drum, respectively
Teel-6-P3	Western sidewall at 1.5, 4.5, and 5.5 ft. bgs	Evaluate soil quality near the surface, at, and below the purported depth of the buried drum, respectively
TEEL-6-P4	Northern sidewall at 2, 4.5, and 5.5 ft. bgs	Evaluate soil quality near the surface, at, and below the purported depth of the buried drum, respectively

One sample (TEEL-6-P1B) was collected with a field duplicate (TEEL-6-P1D) for quality assurance purposes.

Each sample collected was submitted for analysis of the PA Short List for Petroleum Products (**Appendix A – Table 2**) and ethylene glycol.

4.12.2 Teel 6 Wellsite Surface Water Sampling and Rationale

Two surface water samples were collected at the Teel 6 Wellsite from Meshoppen Creek, one upgradient and one downgradient of the Wellsite (**Figure 4.12-3**). The upgradient location was selected from the swampy area at the base of the slope below and hydraulically upstream from the Wellsite, while the downgradient location was placed at the outlet from this swampy area.

4.12.3 Teel 6 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for the Teel 6 Wellsite soil samples are provided on **Table 4.12-1**. None of the VOCs or SVOCs analyzed were present at concentrations above their respective laboratory reporting limits. Lead was detected in each of the 13 soil samples but at concentrations below its SHS R-U MSC. Ethylene glycol was not detected in any soil sample from the Teel 6 Wellsite above the laboratory reporting limit.

4.12.4 Teel 6 Wellsite Surface Water Quality Results and Comparison to Standards

The results of water quality analyses for the Teel 6 Wellsite samples are provided in **Table 4.12-2**. Constituents of the PA Short List for Diesel were not detected at concentrations above the laboratory reporting limit.

4.13 TEEL 7 WELLSITE

URS conducted sampling and analysis of soil samples from two soil borings (2 samples) and surface water samples at four locations (4 samples) at the Teel 7 Wellsite (**Figure 4.13-1**).

4.13.1 Teel 7 Wellsite Soil Boring Locations and Rationale

Two soil borings were located adjacent to the reserve pit and targeted to the topographic and presumed hydraulically downgradient side, as near as practicable to the edge of the pit based on the limits as defined by the Cabot superintendent. **Figure 4.13-2** shows the locations of the soil borings relative to the reserve pit.

4.13.2 Teel 7 Wellsite Surface Water Sampling and Rationale

URS collected four surface water samples associated with the Teel 7 Wellsite: a wetland associated with Meshoppen Creek, immediately upgradient and downgradient of the Wellsite; and downstream of the wetland immediately downgradient of the Wellsite (**Figure 4.13-3**).

4.13.3 Teel 7 Wellsite Soil Quality Results and Comparison to Standards

The results of soil quality analyses for the Teel 7 Wellsite soil samples are provided on **Table 4.13-1**. With the exception of acetone (which is commonly associated with field sample preservation and laboratory handling), none of the VOCs and SVOCs analyzed were detected at concentrations above their respective laboratory reporting limits. A number of metals were present but at concentrations below their respective SHS R-U MSCs. Indicator parameters ASTM chloride in soil, MBAS, and ethylene glycol were not detected in either soil sample at concentrations above their respective laboratory reporting limits.

4.13.4 Teel 7 Wellsite Surface Water Quality Results and Comparison to Standards

The results of surface water quality analyses for Teel 7 Wellsite water samples are provided on **Table 4.13-2**. Due to its proximity, the data from the Teel 5 Wellsite downgradient surface water sample was used as an additional upgradient water quality point for comparison.

VOCs, SVOCs, and DRO were not detected in surface water samples above the laboratory reporting limit, with the exception of bis(2-ethylhexyl) phthalate in one of the samples from the wetland that was detected slightly above the laboratory reporting limit, but did not exceed the surface water quality criteria.

Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in each of the three samples. Alkalinity ranged from 24 mg/l to 30 mg/l, while the pH of the sample from a wetland immediately downgradient of the Teel 7 Wellsite was lower than the surface water quality criteria for aquatic life. The sample further downgradient had a neutral pH.

Total metals analyses identified detectible concentrations of 17 metals in samples from the wetlands upgradient (Teel 7-A) and downgradient (Teel 7-B) of the Wellsite. The total metals samples from further upgradient (Teel 5-C) and downgradient (Teel 7-C) locations relative to Teel 7 Wellsite identified only aluminum, barium, calcium, iron, magnesium, manganese, potassium, and sodium above the laboratory reporting limits. The dissolved (filtered) portions of the three samples identified detectible concentrations of barium, calcium, iron, magnesium, manganese, potassium, and sodium only.

No metals were detected above the surface water quality criteria with the exception of aluminum and iron in the two samples from the wetlands (Teel 7-A and 7-B). Total aluminum and total iron from the sample from each wetland were above the surface water quality criteria for aquatic life. Dissolved iron in wetland sample Teel 7-B was also above the surface water quality criteria for human health, likely due to the relatively low pH observed in this wetland that is typical of naturally-occurring conditions in such environments. No other metals or other constituents were detected above their surface water quality criterias, as would have been expected had the results been attributable to drilling activities. The

aluminum and iron observations are consistent with expected variability in sediment and surface water quality in pond and wetland environments. In ponds and wetlands, aluminum and iron concentrations often vary widely and range higher than in streams due to a variety of naturally-occurring detritus and humic material that collects in areas of standing water and variables such as depth, rainfall, use, turbidity, and water chemistry. These results indicate that the aluminum and iron observations are associated with sediment in the wetland environment. They do not indicate releases or water quality impacts related to Cabot's operations at the Teel 7 Wellsite.

5.0 SUMMARY AND CONCLUSIONS

This investigation involved analyses of constituents for which there is an established medium-specific concentration (MSC) in soils as well as several indicator parameters for which there is no MSC, but that could indicate past releases from processes related to natural gas operations.

The "indicator parameters," including Methylene Blue Active Substances (MBAS – surfactants), ethylene glycol, and DRO, were not commonly present in soil and surface water at the Wellsites evaluated. Of the 13 Wellsites studied, one or more of these indicator parameters were detected at six. MBAS were detected in soil at Black 1H, Brooks 1H, Ely 1H/5H7H, and Gesford 2/7H NW. Either DRO or regulated diesel constituents were detected in soil at Brooks 1H, Ely 4/6H, Gesford 2/7H NW and Gesford 3/9. DRO were detected in surface water at one Wellsite (Teel 5), but in the upstream sample relative to this Wellsite.

This investigation also sampled for constituents for which PADEP has established either an MSC in soils or groundwater, or water quality criteria for surface water. The investigation detected such constituents in a limited number of the Wellsites investigated, but none were detected above its Statewide Health Standard (SHS) residential, used-aquifer (R-U) Medium-Specific Concentration (MSC), except for manganese in a few isolated soil samples, and arsenic in soil. However, the Wellsites meet PADEP's standards under an Act 2 attainment demonstration for manganese and arsenic under the Statewide Health or Background Standards. Arsenic in soil was observed at concentrations within the range of naturally-occurring background concentrations observed in the area, as discussed in more detail below.

Overall, metals were the most commonly detected of the constituents in both soil and surface water samples. The most common naturally-occurring mineral-forming metals such as aluminum, iron, manganese, magnesium, potassium, and sodium were identified in the majority of samples. The presence of these metals, at the concentrations observed, are indicative of the normal mineral content of the soil and water sampled and do not provide evidence of a release.

Arsenic was the only metal observed in soil at concentrations above its Statewide Health Standard (SHS) residential, used-aquifer (R-U) Medium-Specific Concentration (MSC) at several Wellsites. It was detected above its SHS R-U MSC sporadically across the study area, both in soil and fill materials used to construct Wellsites. Arsenic or arsenic-based compounds are not known to be used in drilling or hydraulic fracturing or in substances that are alleged by Mr. Ely to have been released at the various Wellsites evaluated. The range of arsenic concentrations detected is narrow, with no soil sample showing arsenic above 42.6 mg/kg. Prior studies of naturally occurring arsenic in soil performed by Cabot in Dimock and Springville Townships have shown that the natural background concentration of arsenic has been up to 236 mg/kg. Arsenic at the observed concentrations is representative of the range of native content in soil and bedrock in the study area and within the naturally-occurring background concentrations in the area of these Wellsites.

The specific results of sampling and analysis of soil from soil borings and test pits, and surface water samples, by individual Wellsite, are summarized below.

5.1 Black 1H Wellsite

Sampling and analysis of soil from two soil borings (2 samples) and 12 surface soil locations (12 samples), and surface water samples from two locations (2 samples) at the Black 1H Wellsite identified the following:

- Low levels (less than 1 mg/kg) of the indicator parameter MBAS were observed in subsurface soil at this Wellsite in one of two samples. No standard is promulgated for MBAS, which could be indicative of either naturally occurring or man-made surfactants;
- Metals detected in soil were observed at concentrations below their SHS R-U MSCs;
- No volatile Organic Compounds (VOCs) or Semi-Volatile Organic Compounds (SVOCs) were detected in soil above their respective SHS R-U MSCs; and
- Surface water samples collected shortly after the suspected released indicated metal constituents higher than the surface water quality criteria. Surface water analyses for the two surface water samples collected in late 2009 show no constituents above the surface water quality criteria except for total aluminum in one of the two downgradient, unfiltered samples, which was very slightly higher than the surface water quality criteria for aquatic life. These observations are consistent with expected

variability in sediment and surface water quality. They do not indicate current surface water impacts at the Black 1H Wellsite.

URS later installed three groundwater monitoring wells and sampled them in November 2010,March 2011, June 2011, and August 2011. The results of the quarterly sampling for a one-year period demonstrate attainment of the SHS R-U MSC for groundwater at the downgradient point of compliance (MW-1) under Act 2. Results of confirmational soil sampling and groundwater monitoring, as well as surface water sampling done shortly after the suspected release, are reported in a Remedial Investigation and Final Report ("Final Report") submitted to PADEP by Cabot with this report.

The 2010-2011 groundwater findings detailed in the Final Report are summarized below:

- As is typical in groundwater sampling, total and dissolved metals were detected in most groundwater collected. Concentrations of all constituents were below their respective MSCs at the point of compliance ("POC") well, demonstrating attainment of the SHS R-U MSCs; and
- No TCL VOCs or TCL SVOCs were detected in groundwater samples at concentrations above their respective SHS R-U MSCs for all samples.

URS also conducted confirmational sampling to evaluate for soil impacts in the area of the seep. Arsenic and manganese in soil downhill from the well pad both exceeded their respective SHS R-U MSC in two of 12 randomly-located samples. These findings demonstrate attainment of the SHS R-U MSCs under the 75%-10X Rule (PA Title 25, §250.707(b)(1)(i)) for arsenic and manganese. Random sampling locations were determined using PADEP's systematic random sampling protocol..

5.2 Brooks 1H Wellsite

Sampling and analysis of soil from 9 test pits (18 samples) and surface water samples from two locations (2 samples) at the Brooks 1H Wellsite identified the following:

- MBAS and DRO were detected in three of the 18 samples analyzed; however, these constituents are indicator parameters and as such, are not regulated (there is not an

established MSC under Act 2). The regulated petroleum constituents in samples exhibiting DRO were present below the respective SHS R-U MSCs;

- SVOCs were not detected above their respective SHS R-U MSCs;
- None of the VOCs, SVOCs, and petroleum hydrocarbons were detected in surface water samples;
- No metals were detected above the surface water quality criteria; and
- Chloride and TDS were not detected in either surface water sample at concentrations above the surface water quality criteria.

5.3 W. Chudleigh 1 Wellsite

Sampling and analysis of soil from two soil borings (2 samples) and surface water samples from two locations (2 samples) at the W. Chudleigh 1 Wellsite identified that none of the constituents analyzed under the Pit/Frac Suite of compounds* (**Appendix A – Table 2**) were present in either the soil at concentrations above their respective SHS R-U MSCs or the surface water at concentrations above the surface water quality criteria numeric concentrations except for total aluminum and total iron in the unfiltered, downstream sample. Results for dissolved aluminum (not detected above the laboratory reporting limit) and dissolved iron (below the human health standard) indicate these constituents are associated with sediment collected from the stream. These observations are consistent with expected variability in sediment and surface water quality. They do not indicate releases or surface water impacts related to Cabot's operations at the W. Chudleigh 1 Wellsite.

* The Pit/Frac Suite of Compounds was developed with input from PADEP to investigate the potential for the content of drill pits or hydraulic fracturing fluids to have been released into the environment.

5.4 Costello 1 Wellsite

Sampling and analysis of soil from two soil borings (2 samples) and surface water samples from three locations (3 samples) at the Costello 1 Wellsite identified the following:

- Indicator parameters DRO, MBAS, and ethylene glycol were not detected in any of the soil or surface water samples analyzed;

- VOCs and SVOCs were not detected in soil above their respective SHS R-U MSCs. No VOCs or SVOCs were detected in surface water samples above the laboratory reporting limit;
- Arsenic was present at 12.5 mg/kg in one of the two samples analyzed above its SHS R-U MSC of 12 mg/kg, which is within the range of naturally-occurring arsenic for soils. The remainder of the metals analyzed were not detected in soil above their respective SHS R-U MSCs.
- Chloride and TDS were not detected in either surface water sample at concentrations above the surface water quality criteria; and
- No constituent was present in any surface water sample above the surface water quality criteria except for total aluminum and total iron in the sample from the pond, which were above the surface water quality criteria for aquatic life. Results for dissolved aluminum (not detected above the laboratory reporting limit) and dissolved iron (below the human health standard) indicate these constituents are associated with sediment collected from the pondNo other metals or constituents were observed above the surface water quality criteria, as would have been expected if the aluminum and iron observations been attributable to drilling activities.

5.5 Ely 1H/5H/7H SE Wellsite

Sampling and analysis of soil from four soil test borings (4 samples) and four test pits (8 samples) at the Ely 1H/5H/7H SE Wellsite identified the following:

- For the soil samples for the soil test boreholes:
    - Indicator parameters MBAS and ASTM chloride in soil were not detected in three of the four soil samples. In the fourth soil sample, results for both parameters were only slightly above the laboratory reporting limits; therefore, neither is considered to be cause for concern;
    - Ethylene glycol was not detected above the laboratory reporting limit;
    - The VOCs acetone, methyl ethyl ketone (2-butanone), and toluene were detected below their respective SHS R-U MSCs. The SVOC m&p-cresols was detected above the laboratory reporting limit, but below its SHS R-U MSC. No other SVOCs were detected in the soil samples from the soil test boreholes.

- No metals were detected in soil samples at concentrations above their respective SHS R-U MSCs.

- For the soil samples from the four test pits (8 samples), all analytes for parameters on the PA Short List for Diesel (**Appendix A – Table 2**) were not detected above the laboratory reporting limit.

5.6 Ely 2 Wellsite

Sampling and analysis of soil from two soil test boreholes (2 samples) and surface water samples from two locations at the Ely 2 Wellsite identified the following:

- MBAS and ASTM chloride in soil were not detected in either of the two soil samples analyzed;
- Ethylene glycol was not detected in soil in either of the samples analyzed;
- The VOCs acetone, methyl ethyl ketone (2-butanone), and toluene were detected in soil below their respective SHS R-U MSCs. No SVOCs were detected in either soil sample. No VOCs or SVOCs were detected in surface water;
- Arsenic was present in the two samples analyzed (19.6 and 15.4 mg/kg) above its SHS R-U MSC of 12 mg/kg, which is within the range of naturally-occurring arsenic for soils in the area. Other metals detected in soil were all observed at concentrations less than their respective SHS R-U MSCs; and
- No constituent was detected in surface water above its surface water quality criteria for human health. No constituent was detected above its surface water quality criteria for aquatic life except total aluminum and total iron in the unfiltered downgradient stream sample. No other metals or other constituents exceeded its surface water quality criteria, as would have been expected to be observed if these results were attributable to drilling activities. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality. They do not indicate impacts related to Cabot's operations at the Ely 2 Wellsite.

5.7 Ely 4/6H Wellsite

Sampling and analysis of soil from 7 test pits (14 samples) and surface water samples from two locations at the Ely 4/6H Wellsite identified the following:

- ASTM chloride in soil was detected in four of the 14 soil samples analyzed; however, this parameter is not regulated in soils, and there is not an established MSC under Act 2. Neither chloride nor TDS were detected in surface water above the State Water Quality Criteria. The concentrations of ASTM chloride in soil observed would not be expected to impact nearby surface waters or groundwater;
- Indicator parameters ethylene glycol and MBAS were not detected in soil;
- The indicator parameter DRO was detected in five of the 14 samples analyzed. Analysis of the samples for the PA Short List for Diesel shows that none of these compounds were present in the soil samples at concentrations above their respective SHS R-U MSCs;
- No SVOCs were detected in soil samples above their respective SHS R-U MSCs;
- VOCs and SVOCs, and the indicator parameters ethylene glycol, MBAS and DRO, were not detected in surface water samples above the laboratory reporting limit. Metals and chloride detected in surface water samples were at concentrations below their respective surface water quality criteria; and
- The pH of two of the three surface water samples was outside of (lower than) the range of its surface water quality criteria for aquatic life. There was no observed impact to surrounding soils or water supplies from this localized observation and none would be expected.

5.8 Gesford 2/7H NW Wellsite

Sampling and analysis of soil from 16 test pits (33 samples) at the Gesford 2/7H NW Wellsite identified the following:

- ASTM chloride in soil was detected in seven of the 33 soil samples analyzed; however, this constituent is not regulated in soil and there is not an established MSC under Act 2. Neither chloride nor TDS were detected in surface water above the State Water Quality Criteria. The concentrations of ASTM chloride in soil observed would not be expected to impact nearby surface or groundwater;
- The indicator parameter MBAS was detected in soil in one of the samples analyzed;
- Arsenic was detected above its SHS R-U MSC in 28 of the 33 samples analyzed, with a maximum observed concentration of 42.6 mg/kg, which is within the range of

naturally-occurring arsenic for soil. The remaining metals analyzed were all at concentrations less than their respective SHS R-U MSCs in all samples; and

- VOCs and SVOCs analyzed were not detected in soil at concentrations above their respective SHS R-U MSCs.

5.9 Gesford 3/9 Wellsite

Sampling and analysis of soil from five soil borings (6 samples) and six soil test pits (13 samples) and surface water samples from two locations at the Gesford 2H/9H Wellsite identified the following:

- Indicator parameters ASTM chloride in soil, ethylene glycol, and MBAS were not detected in any of the six soil boring samples analyzed;
- Arsenic was detected in soil above its SHS R-U MSC in each of the six soil samples from the soil borings, with a maximum observed concentration of 35.6 mg/kg, which is within the range of naturally-occurring arsenic for soil in the area. All other metals analyzed were all observed at concentrations less than their respective SHS R-U MSCs for all samples;
- The VOCs detected were present at concentrations below their respective SHS R-U MSCs. No SVOCs were present at concentrations above their respective SHS R-U MSCs;
- Potential diesel constituents were detected in both soil samples from one test pit (P1) at concentrations below their respective SHS R-U MSCs. These constituents were not detected in any of the remaining ten soil samples from the surrounding test pits;
- Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in either surface water sample;
- VOCs and SVOCs, and the indicator parameter DRO were not detected in surface water samples above the laboratory reporting limit; and
- Metals detected in surface water samples were not detected at concentrations above their respective surface water quality criteria.

5.10 Lewis 2 Wellsite

Sampling and analysis of soil from two soil borings (2 samples) and 4 test pits (9 samples), and surface water samples from three locations at the Lewis 2 Wellsite identified the following:

- ASTM chloride in soil, ethylene glycol, MBAS, VOCs, and SVOCs were not detected in either of the two soil samples from the soil test boreholes;
- Diesel constituents on the PA short list for Diesel were not detected above their respective laboratory reporting limits or their respective SHS R-U MSCs in the 9 samples of soil samples from the test pits;
- Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in any of the three surface water samples;
- VOCs and SVOCs, and the indicator parameter DRO were not detected in surface water samples above the laboratory reporting limit; and
- No constituent was detected in surface water above its surface water quality criteria for human health. No constituent was detected above its surface water quality criteria for aquatic life except total aluminum and total iron in the unfiltered sample from the pond. No other metal or other constituent exceeded its surface water quality criteria, as would have been expected to be observed if these results were attributable to drilling activities. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality. The aluminum and iron observations do not indicate impacts related to Cabot's operations at the Lewis 2 Wellsite.

5.11 Teel 5 Wellsite

Sampling and analysis of soil from two soil test borings (2 samples) and surface water samples from three locations (3 samples) at the Teel 5 Wellsite identified the following:

- VOCs and SVOCs, and the indicator parameters ASTM chloride in soil, ethylene glycol, MBAS, were not detected in the two soil samples from the soil test boreholes;
- Arsenic was detected in soil above its SHS R-U MSC in one of the two soil samples analyzed, at a concentration of 14.1 mg/kg. This concentration is within the background range of concentrations of arsenic found in naturally-occurring, native

materials in the area of the Wellsite. Other metals analyzed were all observed at concentrations less than their respective SHS R-U MSCs.

- VOCs and SVOCs were not detected in surface water samples above the laboratory reporting limit. Metals detected in surface water samples were observed at concentrations below their respective surface water quality criteria.
- Chloride and TDS were not detected at concentrations above their respective surface water quality criteria in any of the three surface water samples; and
- The indicator parameter DRO was detected in one surface water sample (upgradient) above the laboratory reporting limit. This finding was for the upstream sample and does not indicate any concern related to the Wellsite.

5.12 Teel 6 Wellsite

Sampling and analysis of soil from one test pit (13 samples) and surface water samples from two locations at the Teel 6 Wellsite identified the following:

- Ethylene glycol and regulated petroleum hydrocarbon constituents were not detected in any of the 13 soil test pit samples analyzed above the laboratory reporting limit;
- Lead was detected in soil but below its SHS R-U MSC; and
- Constituents on the PA Short List for Diesel were not detected in surface water samples above the laboratory reporting limit.

5.13 Teel 7 Wellsite

Sampling and analysis of soil samples from two soil borings (2 samples) and surface water samples at four locations (4 samples) at the Teel 7 Wellsite identified the following:

- ASTM chloride in soil, ethylene glycol, MBAS, VOCs, and SVOCs were not detected in either of the soil boring samples analyzed, with the exception of the VOC acetone (which is commonly associated with field sample preservation and laboratory handling), Acetone was present at concentrations below its SHS R-U MSC;
- Metals detected in soil were at concentrations below their SHS R-U MSC;
- Chloride and TDS were not detected at concentrations above their respective SHS R-U MSCs and respective surface water quality criteria in each of the four surface water

samples. The pH of the water in one of the wetland samples was outside of (lower than) the range of its-surface water quality criteria for aquatic life;

- The indicator parameter DRO and regulated petroleum constituents were not detected in any of the surface water samples in excess of the laboratory reporting limit.
- VOCs and SVOCs were not detected in surface water samples above the laboratory reporting limit, with the exception of bis(2-ethylhexyl) phthalate in one of the samples from the wetland that was detected slightly above the laboratory reporting limit, but did not exceed the surface water quality criteria; and
- No constituents were detected in surface water above its surface water quality criteria except total aluminum and total iron in the two samples from the wetlands, which exceeded the surface water quality criteria for aquatic life, and one sample from one of the wetlands, which exceeded the surface water quality criteria for human health. No other metals or other constituents were detected above their surface water quality criteria, as would have been expected had the results been attributable to drilling activities. The aluminum and iron observations are consistent with expected variability in sediment and surface water quality in pond and wetland environments. They do not indicate releases or impacts related to Cabot's operations at the Teel 7 Wellsite.

In summary no constituent was detected above its respective Statewide Health Standard (SHS) residential, used-aquifer (R-U) Medium-Specific Concentration (MSC), except for manganese in a few isolated soil samples, and arsenic in soil. All Wellsites meet PADEP's standards under Act 2 for manganese and arsenic under the Statewide Health or the Background Standard. Arsenic in soil was detected above its SHS R-U MSC sporadically across the study area, both in soil and fill materials used to construct Wellsites. Arsenic or arsenic-based compounds are not known to be used in drilling or hydraulic fracturing or in substances that are alleged by Ex. 6 - Personal Privacy to have been released at the various Wellsites evaluated. The range of arsenic concentrations detected is narrow, with no soil sample showing arsenic above 42.6 mg/kg. Prior studies of naturally occurring arsenic in soil performed by Cabot in Dimock and Springville Townships have shown that the natural background concentration of arsenic has been up to 236 mg/kg. Arsenic at the observed concentrations is representative of the range of native content in soil and bedrock in the study area and within the naturally-occurring background concentrations in the area of these

Wellsites. The observed arsenic concentrations are, therefore, due to the presence of naturally-occurring minerals in the soil and sediment of the region.

Concentrations of aluminum and iron in surface water samples collected from streams in the vicinity of the Wellsites is consistent with expected variability in sediment and surface water quality for streams near the study area, as reflected in data collected by the U.S. Geological Survey (USGS). USGS data for total aluminum ranges from not detected at the laboratory reporting limit to 6,600 ug/L. USGS for total iron ranges from not detected at the laboratory reporting limit to 325,000 ug/L. Samples collected as part of this investigation from streams observed concentrations of total aluminum ranging from not detected at the laboratory reporting limit up to 3,110 ug/L and for total iron from not detected at the laboratory reporting limit up to 3,120 ug/L. The observed results do not indicate a release or impacts to streams related to Cabot's drilling activity at any Wellsite.

Concentrations of total aluminum and total iron observed in wetland environments and ponds sampled as part of this investigation observed total aluminum and total iron concentrations that range higher than in the streams sampled, but are still within the anticipated range of concentrations for the pond and wetland environments. In ponds and wetlands, aluminum and iron concentrations often vary widely due to a variety of naturally-occurring detritus and humic material that collects in areas of standing water and variables such as depth, rainfall, use, turbidity, and water chemistry. The observed results do not indicate a release or impacts to ponds or wetlands related to Cabot's drilling activity at any Wellsite.

TABLES

Table 4.1-1
Analytical Results for Soil
Black 1H Wellsite

Dimock Township
Susquehana County, PA

Sample Identification Sample Date Parameter	Units	BLACK-1-B1 5/25/2010	BLACK-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses				
Percent Moisture (ASTM D2974-87)	%	4.8	6.2	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	15	ND (5.2)	NS
Chloride (SM 4500-Cl-E)	mg/L	ND (3.0)[2]	5	NS
Surfactants (MBAS SM 5540C)	mg/L	0.13	ND (0.10)	NS
Ethylene Glycol (EPA 8015)	mg/kg	ND (10.0)	ND (10.0)	1,400
Metals Analyses (6010B/7470)				
Aluminum	mg/kg	13,100	12,100	190,000
Antimony	mg/kg	ND (0.35)	ND (0.38)	27
Arsenic	mg/kg	9.5	3.9	12
Barium	mg/kg	185	142	8,200
Beryllium	mg/kg	0.69	0.6	320
Boron	mg/kg	6.5	7.1	1,900
Cadmium	mg/kg	0.29	0.27	38
Calcium	mg/kg	3,320	1,560	NS
Chromium	mg/kg	16.3	16.6	190000[4]
Cobalt	mg/kg	11.8	11.1	50
Copper	mg/kg	16.4	8.1	8,100
Iron	mg/kg	25,900	26,300	150,000
Lead	mg/kg	6.8	2.8	450
Magnesium	mg/kg	5,500	4,970	NS
Manganese	mg/kg	532	402	2,000
Molybdenum	mg/kg	ND (1.4)	ND (1.5)	650
Nickel	mg/kg	24.7	23.1	650
Potassium	mg/kg	1,600	1,660	NS
Selenium	mg/kg	ND (0.35)	0.48	26
Silver	mg/kg	0.67	0.88	84
Sodium	mg/kg	ND (346)	ND (382)	NS
Thallium	mg/kg	ND (1.4)	ND (1.5)	14
Vanadium	mg/kg	14	15.1	1,500
Zinc	mg/kg	65.6	55	12,000
Mercury	mg/kg	ND (0.10)	ND (0.11)	10
VOC Analyses (8260)				
1,1,1-Trichloroethane	mg/kg	ND (0.0067)	ND (0.0083)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0067)	ND (0.0083)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0067)	ND (0.0083)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0067)	ND (0.0083)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0067)	ND (0.0083)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0067)	ND (0.0083)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0067)	ND (0.0083)	60
1,2-Dichloroethane	mg/kg	ND (0.0067)	ND (0.0083)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0134)	ND (0.0166)	7[5]
1,2-Dichloropropane	mg/kg	ND (0.0067)	ND (0.0083)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0067)	ND (0.0083)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0067)	ND (0.0083)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0067)	ND (0.0083)	10
2-Butanone (MEK)	mg/kg	ND (0.0134)	ND (0.0166)	400

Table 4.1-1
Analytical Results for Soil
Black 1H Wellsite

Dimock Township
Susquehana County, PA

Sample Identification Sample Date Parameter	Units	BLACK-1-B1 5/25/2010	BLACK-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
VOC Analyses (8260)				
2-Hexanone	mg/kg	ND (0.0134)	ND (0.0166)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0134)	ND (0.0166)	290
Acetone	mg/kg	0.107	0.225	3,300
Benzene	mg/kg	ND (0.0067)	ND (0.0083)	0.5
Bromodichloromethane	mg/kg	ND (0.0067)	ND (0.0083)	8
Bromoform	mg/kg	ND (0.0067)	ND (0.0083)	8
Bromomethane	mg/kg	ND (0.0067)	ND (0.0083)	1
Carbon disulfide	mg/kg	ND (0.0067)	ND (0.0083)	150
Carbon tetrachloride	mg/kg	ND (0.0067)	ND (0.0083)	0.5
Chlorobenzene	mg/kg	ND (0.0067)	ND (0.0083)	10
Chloroethane	mg/kg	ND (0.0067)	ND (0.0083)	23
Chloroform	mg/kg	ND (0.0067)	ND (0.0083)	8
Chloromethane	mg/kg	ND (0.0067)	ND (0.0083)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0067)	ND (0.0083)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0067)	ND (0.0083)	0.66
Dibromochloromethane	mg/kg	ND (0.0067)	ND (0.0083)	8
Ethylbenzene	mg/kg	ND (0.0067)	ND (0.0083)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0067)	ND (0.0083)	600
m&p-Xylene	mg/kg	ND (0.0134)	ND (0.0166)	1000[5]
Methylene Chloride	mg/kg	ND (0.0067)	ND (0.0083)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0067)	ND (0.0083)	2
Naphthalene	mg/kg	ND (0.0067)	ND (0.0083)	25
n-Butylbenzene	mg/kg	ND (0.0067)	ND (0.0083)	950
n-Propylbenzene	mg/kg	ND (0.0067)	ND (0.0083)	290
o-Xylene	mg/kg	ND (0.0067)	ND (0.0083)	1000[5]
p-Isopropyltoluene	mg/kg	ND (0.0067)	ND (0.0083)	NS
sec-Butylbenzene	mg/kg	ND (0.0067)	ND (0.0083)	350
Styrene	mg/kg	ND (0.0067)	ND (0.0083)	24
Tetrachloroethene	mg/kg	ND (0.0067)	ND (0.0083)	0.5
Toluene	mg/kg	ND (0.0067)	ND (0.0083)	100
TOTAL BTEX	mg/kg	ND (0.0401)	ND (0.0497)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0067)	ND (0.0083)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0067)	ND (0.0083)	0.66
Trichloroethene	mg/kg	ND (0.0067)	ND (0.0083)	0.5
Vinyl chloride	mg/kg	ND (0.0067)	ND (0.0083)	0.2
Xylene (Total)	mg/kg	ND (0.0200)	ND (0.0249)	1,000
SVOC Analyses (8270)				
1,2,4-Trichlorobenzene	mg/kg	ND (0.346)	ND (0.349)	27
1,2-Dichlorobenzene	mg/kg	ND (0.346)	ND (0.349)	60
1,3-Dichlorobenzene	mg/kg	ND (0.346)	ND (0.349)	61
1,4-Dichlorobenzene	mg/kg	ND (0.346)	ND (0.349)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.866)	ND (0.874)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.346)	ND (0.349)	11
2,4-Dichlorophenol	mg/kg	ND (0.346)	ND (0.349)	2
2,4-Dimethylphenol	mg/kg	ND (0.346)	ND (0.349)	73
2,4-Dinitrophenol	mg/kg	ND (0.866)	ND (0.874)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.346)	ND (0.349)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.346)	ND (0.349)	3.7

Table 4.1-1
Analytical Results for Soil
Black 1H Wellsite

Dimock Township
Susquehana County, PA

Sample Identification Sample Date Parameter	Units	BLACK-1-B1 5/25/2010	BLACK-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOC Analyses (8270)				
2-Chloronaphthalene	mg/kg	ND (0.348)	ND (0.349)	6,200
2-Chlorophenol	mg/kg	ND (0.348)	ND (0.349)	4.4
2-Methylnaphthalene	mg/kg	ND (0.348)	ND (0.349)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.348)	ND (0.349)	180
2-Nitroaniline	mg/kg	ND (0.866)	ND (0.874)	11
2-Nitrophenol	mg/kg	ND (0.348)	ND (0.349)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.822)	ND (0.698)	18[7]
3,3'-Dichlorobenzidine	mg/kg	ND (0.348)	ND (0.349)	8.3
3-Nitroaniline	mg/kg	ND (0.868)	ND (0.874)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.868)	ND (0.874)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.348)	ND (0.349)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.348)	ND (0.349)	37
4-Chloroaniline	mg/kg	ND (0.348)	ND (0.349)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.348)	ND (0.349)	NS
4-Nitroaniline	mg/kg	ND (0.866)	ND (0.874)	3.3
4-Nitrophenol	mg/kg	ND (0.348)	ND (0.349)	6
Acenaphthene	mg/kg	ND (0.348)	ND (0.349)	2,700
Acenaphthylene	mg/kg	ND (0.348)	ND (0.349)	2,500
Anthracene	mg/kg	ND (0.348)	ND (0.349)	350
Benzo(a)anthracene	mg/kg	ND (0.348)	ND (0.349)	5.7
Benzo(a)pyrene	mg/kg	ND (0.348)	ND (0.349)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.348)	ND (0.349)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.348)	ND (0.349)	180
Benzo(k)fluoranthene	mg/kg	ND (0.348)	ND (0.349)	57
Benzyl alcohol	mg/kg	ND (0.348)	ND (0.349)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.348)	ND (0.349)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.348)	ND (0.349)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.348)	ND (0.349)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.348)	ND (0.349)	130
Butylbenzylphthalate	mg/kg	ND (0.348)	ND (0.349)	3,000
Chrysene	mg/kg	ND (0.348)	ND (0.349)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.348)	ND (0.349)	0.57
Dibenzofuran	mg/kg	ND (0.348)	ND (0.349)	95
Diethylphthalate	mg/kg	ND (0.348)	ND (0.349)	2900
Dimethylphthalate	mg/kg	ND (0.348)	ND (0.349)	NS
Di-n-butylphthalate	mg/kg	ND (0.348)	ND (0.349)	1500
Di-n-octylphthalate	mg/kg	ND (0.348)	ND (0.349)	8,800
Fluoranthene	mg/kg	ND (0.348)	ND (0.349)	3,200
Fluorene	mg/kg	ND (0.348)	ND (0.349)	3,000
Hexachloro-1,3-butadiene	mg/kg	ND (0.348)	ND (0.349)	10
Hexachlorobenzene	mg/kg	ND (0.348)	ND (0.349)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.348)	ND (0.349)	91
Hexachloroethane	mg/kg	ND (0.348)	ND (0.349)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.348)	ND (0.349)	5.7

Table 4.1-1
Analytical Results for Soil
Black 1H Wellsite

Dimock Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	BLACK-1-B1 5/25/2010	BLACK-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOC Analyses (8270)				
Isophorone	mg/kg	ND (0.346)	ND (0.349)	**10**
Naphthalene	mg/kg	ND (0.346)	ND (0.349)	**25**
Nitrobenzene	mg/kg	ND (0.346)	ND (0.349)	**7.3**
N-Nitroso-di-n-propylamine	mg/kg	ND (0.346)	ND (0.349)	**0.0094**
N-Nitrosodiphenylamine	mg/kg	ND (0.346)	ND (0.349)	**20**
Pentachlorophenol	mg/kg	ND (0.866)	ND (0.874)	**5**
Phenanthrene	mg/kg	ND (0.346)	ND (0.349)	**10,000**
Phenol	mg/kg	ND (0.346)	ND (0.349)	**200**
Pyrene	mg/kg	ND (0.346)	ND (0.349)	**2,200**

Notes:

[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.

[2]= ND (3.0) = Parameter not detected at the detection limit specified in parentheses.

[3]=No Standard

[4]=as Chromium III.

[5]=as cis-1,2-dichloroethene

[6]=as Total xylenes.

[7]=as p-Cresol

12.5 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.1-2
Analytical Results for Soil (Seep Area)
Black 1H Wellsite
Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	BLK1H-1 6/29/2010	BLK1H-2 6/29/2010	BLK1H-3 6/29/2010	BLK1H-4 6/29/2010	BLK1H-5 6/29/2010	BLK1H-6 6/29/2010	BLK1H-7 6/29/2010	BLK1H-8 6/29/2010	BLK1H-9 6/29/2010	BLK1H-10 6/29/2010	BLK1H-11 6/29/2010	BLK1H-12 6/29/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses (ASTM D2974-87)														
Percent Moisture	%	21.5	29.9	30.4	24.8	29.2	43.5	28.2	22.5	27.5	19.6	28	22.3	NS[2]
Metals Analyses (6010/7470)														
Aluminum	mg/kg	13,500	948	15,100	10,300	14,700	18,900	15,100	15,000	12,400	13,200	13,200	15,200	190,000
Antimony	mg/kg	ND (0.8)[3]	0.63	ND (0.41)	ND (0.51)	ND (0.65)	ND (0.69)	ND (0.45)	ND (0.46)	ND (0.39)	ND (0.32)	ND (0.43)	ND (0.37)	27
Arsenic	mg/kg	6.2	8.6	11.4	5.6	10.6	8.8	**27.7**	6.1	**14.9**	9.3	7.0	9.1	12
Barium	mg/kg	179	14.4	304	85.6	246	366	351	172	268	236	691	187	8,200
Beryllium	mg/kg	0.5	3.4	0.94	0.38	0.84	2.7	1.2	0.54	0.82	0.76	0.52	0.74	320
Boron	mg/kg	ND (8)	ND (8)	ND (4.1)	ND (5.1)	ND (8.5)	ND (8.9)	ND (4.5)	ND (4.6)	ND (3.9)	ND (3.2)	ND (4.3)	ND (3.7)	1900
Cadmium	mg/kg	0.24	ND (0.24)	0.21	ND (0.2)	ND (0.26)	0.38	0.3	0.2	ND (0.16)	0.25	ND (0.17)	ND (0.15)	38
Calcium	mg/kg	1,030	659	2,050	344	2,500	1,740	2,360	573	835	1,080	2,890	884	NS
Chromium	mg/kg	12.4	15.2	15.8	10.8	14.7	16.5	18.8	13.4	10.3	11	14.1	14.8	190,000[4]
Cobalt	mg/kg	6.5	9.8	13.0	6.2	12.3	21.5	21.4	6.8	22.6	15	7.8	11.6	50
Copper	mg/kg	8.2	88.0	15.8	4.4	13.7	18.2	25.6	7.8	15.1	13.9	12.3	14.4	8,100
Iron	mg/kg	21,900	5,580	20,500	21,000	19,700	20,200	23,500	22,900	19,600	16,600	18,700	23,400	150,000
Lead	mg/kg	24.0	14.4	28.5	37.6	28.8	40.8	51.6	22.3	66.3	24.0	23.7	20.6	450
Magnesium	mg/kg	2,170	119	3,240	1,730	3,540	2,800	3,180	2,570	2,620	2,250	2,890	3,400	NS
Manganese	mg/kg	418	5	1,070	509	415	**2,130**	1,870	756	**2,060**	1,470	331	422	2,000
Molybdenum	mg/kg	ND (2.4)	2.7	ND (1.7)	ND (2)	ND (2.6)	ND (2.8)	ND (1.8)	ND (1.8)	ND (1.6)	ND (1.3)	ND (1.7)	ND (1.5)	650
Nickel	mg/kg	12.4	39.5	17.1	8.6	17.4	24.2	17.4	13.7	15.6	13.4	13.6	15.9	650
Potassium	mg/kg	1,410	438	1,470	1,300	1,520	1,420	1,450	1,390	1,070	1,020	1,880	1,100	NS
Selenium	mg/kg	ND (0.8)	4.5	ND (0.41)	0.59	ND (0.65)	0.81	ND (0.45)	ND (0.46)	ND (0.39)	ND (0.32)	ND (0.43)	ND (0.37)	26
Silver	mg/kg	ND (0.24)	0.25	0.29	0.29	ND (0.26)	ND (0.28)	0.21	0.21	0.15	0.14	0.18	0.27	84
Sodium	mg/kg	ND (599)	ND (598)	ND (413)	ND (512)	ND (652)	ND (688)	ND (450)	ND (453)	ND (388)	ND (319)	ND (427)	ND (374)	NS
Thallium	mg/kg	ND (2.4)	ND (2.4)	ND (1.7)	ND (2)	ND (2.6)	ND (2.8)	ND (1.8)	ND (1.8)	ND (1.6)	ND (1.3)	ND (1.7)	ND (1.5)	14
Vanadium	mg/kg	20.4	46.9	19.6	20.4	17.4	20.7	21.4	20.2	14.7	15.1	18.6	19.5	1,500
Zinc	mg/kg	62.3	29.1	68.9	42.5	66.4	82.5	55.5	64.8	60.1	67.2	63.8	61.2	12,000
Mercury	mg/kg	ND (0.12)	ND (0.14)	ND (0.14)	ND (0.13)	ND (0.13)	ND (0.17)	ND (0.13)	ND (0.12)	ND (0.14)	ND (0.12)	ND (0.14)	ND (0.12)	10

Notes:

[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.

[2]=No Standard

[3]= ND (0.8) = Parameter not detected at the detection limit specified in parentheses.

[4]=as Chromium III.

27.7 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.1-3
Analytical Results for Surface Water
Black 1H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification / Sample Location / Sample Date / Parameter	Units	BLACK #1 A Downgradient 12/9/2009	BLACK #1 B Sidegradient 12/10/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
General Chemistry						
Acidity, Total (SM 2310B)	mg/L	ND (10.0)[2]	ND (10.0)	NS[3]	NS	NS
Alkalinity, Total as CaCO3 (SM 2320B)	mg/L	10	22	NS	NS	NS
Nitrogen, Ammonia (EPA 350.1)	mg/L	ND (0.10)	ND (0.10)	NS	NS	NS
Chloride (SM 4500-Cl-E)	mg/L	141	42	NS	NS	250
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.10)	ND (0.10)	NS	NS	NS
pH (SM 4500-H+B)	Std. Units	7.0	7.3	6.0-9.0		NS
Total Dissolved Solids (SM 2540C)	mg/L	234	106	NS	NS	750
Diesel Components (DRO, EPA 8015B Mod)	mg/L	ND (0.10)	ND (0.10)	NS	NS	NS
TPH (C06-C10) (GRO, EPA 8015B Mod)	ug/L	ND (200)	ND (200)	NS	NS	NS
Total Petroleum Hydrocarbons (EPA 1664A)	mg/L	ND (4.0)	ND (4.0)	NS	NS	NS
Total Metals Analyses (6010B/7470)						
Aluminum	ug/L	759	144	NS	750	NS
Antimony	ug/L	ND (5.0)	ND (5.0)	220	1,100	5.6
Arsenic	ug/L	ND (5.0)	ND (5.0)	150	340	10
Barium	ug/L	599	63	4,100	21,000	2,400
Beryllium	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron	ug/L	ND (50.0)	ND (50.0)	1,600	8,100	3,100
Cadmium	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Calcium	ug/L	37,300	10,000	NS	NS	NS
Chromium	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Cobalt	ug/L	ND (5.0)	ND (5.0)	19	95	NS
Copper	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Iron	ug/L	693	107	1,500[4]	1,500[4]	NS[4]
Lead	ug/L	ND (2.0)	ND (2.0)	NS	NS	NS
Magnesium	ug/L	7,360	2,080	NS	NS	NS
Manganese	ug/L	234	6.8	NS	NS	1,000
Molybdenum	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Potassium	ug/L	1,990	4,670	NS	NS	NS
Selenium	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Silver	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Sodium	ug/L	33,400	19,500	NS	NS	NS
Thallium	ug/L	ND (10.0)	ND (10.0)	13	65	0.24
Vanadium	ug/L	ND (5.0)	ND (5.0)	100	510	NS
Zinc	ug/L	12	ND (10.0)	NS	NS	NS
Mercury	ug/L	ND (0.20)	ND (0.20)	NS	NS	NS
Dissolved Metals Analyses (6010/7470)						
Aluminum, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Antimony, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Arsenic, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Barium, Dissolved	ug/L	437	70.4	NS	NS	NS
Beryllium, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Cadmium, Dissolved	ug/L	ND (1.0)	ND (1.0)	0.25	2.01	NS
Calcium, Dissolved	ug/L	36,800	10,700	NS	NS	NS
Chromium, Dissolved	ug/L	ND (5.0)	ND (5.0)	74.1	569.8	NS
Cobalt, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Copper, Dissolved	ug/L	ND (5.0)	ND (5.0)	9.0	13	NS
Iron, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	300
Lead, Dissolved	ug/L	ND (2.0)	ND (2.0)	2.5	64.6	NS
Magnesium, Dissolved	ug/L	6,920	2,290	NS	NS	NS
Manganese, Dissolved	ug/L	29	7.8	NS	NS	NS
Molybdenum, Dissolved	ug/L	20.6	11.4	NS	NS	NS
Nickel, Dissolved	ug/L	ND (10.0)	ND (10.0)	52	470	610
Potassium, Dissolved	ug/L	1,850	5,180	NS	NS	NS
Selenium, Dissolved	ug/L	ND (5.0)	ND (5.0)	4.6	NS	NS
Silver, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	3.2	NS
Sodium, Dissolved	ug/L	32,000	21,000	NS	NS	NS
Thallium, Dissolved	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Vanadium, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Zinc, Dissolved	ug/L	ND (10.0)	ND (10.0)	120	120	NS
Mercury, Dissolved	ug/L	ND (0.20)	ND (0.20)	0.77	1.4	0.05

Table 4.1-3
Analytical Results for Surface Water
Black 1H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification Sample Location Sample Date Parameter	Units	BLACK #1 A Downgradient 12/9/2009	BLACK #1 B Sidegradient 12/10/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
VOC Analyses (8260)						
1,1,1-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	610	3,000	NS
1,1,2,2-Tetrachloroethane	ug/L	ND (1.0)	ND (1.0)	210	1,000	0.17
1,1,2-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	680	3,400	0.59
1,1-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,1-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,500	7,500	33
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.0)	26	130	35
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	160	820	420
1,2-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	3,100	15,000	0.38
1,2-Dichloroethene (Total)	ug/L	ND (2.0)	ND (2.0)	NS	NS	NS
1,2-Dichloropropane	ug/L	ND (1.0)	ND (1.0)	2,200	11,000	NS
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	150	730	420
2-Butanone (MEK)	ug/L	ND (10.0)	ND (10.0)	32,000	230,000	21,000
2-Hexanone	ug/L	ND (10.0)	ND (10.0)	4,300	21,000	NS
4-Methyl-2-pentanone (MIBK)	ug/L	ND (10.0)	ND (10.0)	5,000	26,000	NS
Acetone	ug/L	ND (10.0)	ND (10.0)	86,000	450,000	3,500
Benzene	ug/L	ND (1.0)	ND (1.0)	130	640	1.2
Bromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Bromodichloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.55
Bromoform	ug/L	ND (1.0)	ND (1.0)	370	1,800	4.3
Bromomethane	ug/L	ND (1.0)	ND (1.0)	110	550	47
Carbon disulfide	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon tetrachloride	ug/L	ND (1.0)	ND (1.0)	560	2,800	0.23
Chlorobenzene	ug/L	ND (1.0)	ND (1.0)	240	1,200	130
Chloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Chloroform	ug/L	ND (1.0)	ND (1.0)	390	1,900	5.7
Chloromethane	ug/L	ND (1.0)	ND (1.0)	5,500	28,000	NS
cis-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
cis-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
Dibromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.4
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	580	2,900	530
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
m&p-Xylene	ug/L	ND (2.0)	ND (2.0)	210[5]	1,100[5]	70,000[5]
Methylene Chloride	ug/L	ND (1.0)	ND (1.0)	2,400	12,000	4.6
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (2.0)	ND (2.0)	43	140	NS
n-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
n-Propylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
o-Xylene	ug/L	ND (1.0)	ND (1.0)	210[5]	1,100[5]	70,000[5]
p-Isopropyltoluene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
sec-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Styrene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Tetrachloroethene	ug/L	ND (1.0)	ND (1.0)	140	700	0.69
Toluene	ug/L	ND (1.0)	ND (1.0)	330	1,700	1,300
trans-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,400	6,800	140
trans-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
Trichloroethene	ug/L	ND (1.0)	ND (1.0)	450	2,300	2.5
Vinyl chloride	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.025
Xylene (Total)	ug/L	ND (3.0)	ND (3.0)	210	1,100	70,000

Table 4.1-3
Analytical Results for Surface Water
Black 1H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification Sample Location Sample Date Parameter	Units	BLACK #1 A Downgradient 12/9/2009	BLACK #1 B Sidegradient 12/10/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOC Analyses (8270)						
1,2,4-Trichlorobenzene	ug/L	ND (1.1)	ND (1.1)	26	130	35
1,2-Dichlorobenzene	ug/L	ND (1.1)	ND (1.1)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.1)	ND (1.1)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.1)	ND (1.1)	150	730	420
1-Methylnaphthalene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
2,4,5-Trichlorophenol	ug/L	ND (2.7)	ND (2.8)	NS	NS	NS
2,4,6-Trichlorophenol	ug/L	ND (1.1)	ND (1.1)	91	460	1.4
2,4-Dichlorophenol	ug/L	ND (1.1)	ND (1.1)	340	1,700	77
2,4-Dimethylphenol	ug/L	ND (1.1)	ND (1.1)	130	660	380
2,4-Dinitrophenol	ug/L	ND (2.7)	ND (2.8)	130	660	69
2,4-Dinitrotoluene	ug/L	ND (1.1)	ND (1.1)	320	1,600	0.05
2,6-Dinitrotoluene	ug/L	ND (1.1)	ND (1.1)	200	990	0.05
2-Chloronaphthalene	ug/L	ND (1.1)	ND (1.1)	NS	NS	1,000
2-Chlorophenol	ug/L	ND (1.1)	ND (1.1)	110	560	81
2-Methylnaphthalene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
2-Methylphenol(o-Cresol)	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
2-Nitroaniline	ug/L	ND (2.7)	ND (2.8)	NS	NS	NS
2-Nitrophenol	ug/L	ND (1.1)	ND (1.1)	1,600	8,000	NS
3&4-Methylphenol(m&p Cresol)	ug/L	ND (2.1)	ND (2.8)	NS	NS	NS
3,3'-Dichlorobenzidine	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
3-Nitroaniline	ug/L	ND (2.7)	ND (2.8)	NS	NS	NS
4,6-Dinitro-2-methylphenol	ug/L	ND (2.7)	ND (2.8)	16	80	13
4-Bromophenylphenyl ether	ug/L	ND (1.1)	ND (1.1)	54	270	NS
4-Chloro-3-methylphenol	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chloroaniline	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chlorophenylphenyl ether	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
4-Nitroaniline	ug/L	ND (2.7)	ND (2.8)	NS	NS	NS
4-Nitrophenol	ug/L	ND (1.1)	ND (1.1)	470	2,300	NS
Acenaphthene	ug/L	ND (1.1)	ND (1.1)	17	83	670
Acenaphthylene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Anthracene	ug/L	ND (1.1)	ND (1.1)	NS	NS	8,300
Azobenzene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(a)anthracene	ug/L	ND (1.1)	ND (1.1)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzoic acid	ug/L	ND (10.7)	ND (11.5)	NS	NS	NS
Benzyl alcohol	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
bis(2-Chloroethoxy)methane	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
bis(2-Chloroethyl) ether	ug/L	ND (1.1)	ND (1.1)	6,000	30,000	0.03
bis(2-Chloroisopropyl) ether	ug/L	ND (1.1)	ND (1.1)	NS	NS	1,400
bis(2-Ethylhexyl)phthalate	ug/L	ND (1.1)	ND (1.1)	910	4,500	1.2
Butylbenzylphthalate	ug/L	ND (1.1)	ND (1.1)	35	140	150
Carbazole	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Chrysene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenzofuran	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Diethylphthalate	ug/L	ND (1.1)	ND (1.1)	800	4,000	17,000
Dimethylphthalate	ug/L	ND (1.1)	ND (1.1)	500	2500	27,000
Di-n-butylphthalate	ug/L	ND (1.1)	ND (1.1)	21	110	2,000
Di-n-octylphthalate	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Fluoranthene	ug/L	ND (1.1)	ND (1.1)	40	200	130
Fluorene	ug/L	ND (1.1)	ND (1.1)	NS	NS	1,100

Table 4.1-3
Analytical Results for Surface Water
Black 1H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification Sample Location Sample Date Parameter	Units	BLACK #1 A Downgradient 12/9/2009	BLACK #1 B Sidegradient 12/10/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOC Analyses (8270) Continued						
Hexachloro-1,3-butadiene	ug/L	ND (1.1)	ND (1.1)	2	10	0.44
Hexachlorobenzene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.00028
Hexachlorocyclopentadiene	ug/L	ND (1.1)	ND (1.1)	1	5	40
Hexachloroethane	ug/L	ND (1.1)	ND (1.1)	12	60	1.4
Indeno(1,2,3-cd)pyrene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Isophorone	ug/L	ND (1.1)	ND (1.1)	2,100	10,000	35
Naphthalene	ug/L	ND (1.1)	ND (1.1)	43	140	NS
Nitrobenzene	ug/L	ND (1.1)	ND (1.1)	810	4,000	17
N-Nitrosodimethylamine	ug/L	ND (1.1)	ND (1.1)	3,400	17,000	0.00069
N-Nitroso-di-n-propylamine	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.005
N-Nitrosodiphenylamine	ug/L	ND (1.1)	ND (1.1)	59	300	3.3
Pentachlorophenol	ug/L	ND (2.7)	ND (2.8)	4.0	5.3	0.27
Phenanthrene	ug/L	ND (1.1)	ND (1.1)	1	5	NS
Phenol	ug/L	ND (1.1)	ND (1.1)	NS	NS	21,000
Pyrene	ug/L	ND (1.1)	ND (1.1)	NS	NS	830

Notes:

[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable. Values provided for chromium are for chromium III. Values for chloride, TDS, pH, manganese and Iron from 25 Pa Code Chapter 93.7, Table 3.

[2]= ND (1.0) = Parameter not detected at the detection limit specified in parentheses.

[3]= No Standard.

[4]= The specific water quality criteria for total recoverable iron is for aquatic life uses and is expressed as a 30-day average concentration. The water quality criteria for human health is expressed as dissolved iron. See 25 PA Code Section 93.7.

[6]= As total xylenes.

5.8 = Result exceeds applicable surface water quality criteria.

Table 4.2-1
Test Pit Analytical Results for Soil
Brooks 1H Wellsite

Dimock Township
Susquehana County, PA

Location Sample Identification Sample Date Parameter	Units	Brooks 1H BRK-1H-P1A 5/25/2010	Brooks 1H BRK-1H-P1B 5/25/2010	Brooks 1H BRK-1H-P2A 5/25/2010	Brooks 1H BRK-1H-P2B 5/25/2010	Brooks 1H BRK-1H-P3A 5/25/2010	Brooks 1H BRK-1H-P3B 5/25/2010	Brooks 1H BRK-1H-P4A 5/25/2010	Brooks 1H BRK-1H-P4B 5/25/2010	Brooks 1H BRK-1H-P5A 5/25/2010	Brooks 1H BRK-1H-P5B 5/25/2010	Brooks 1H BRK-1H-P6A 5/25/2010	Brooks 1H BRK-1H-P6B 5/25/2010	Brooks 1H BRK-1H-P7A 5/25/2010	Brooks 1H BRK-1H-P7B 5/25/2010	Brooks 1H BRK-1H-P8A 5/25/2010	Brooks 1H BRK-1H-P8B 5/25/2010	Brooks 1H BRK-1H-P9A 5/25/2010	Brooks 1H BRK-1H-P9B 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses																				
Percent Moisture (ASTM D2974-87)	%	12.4	10.1	13.2	9.1	12.9	12.3	16.4	9.7	15.2	12	8.3	8.9	10.5	9.9	9	8.4	9.1	9.6	NS[2]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	179	6.2	41	6.8	59.7	18.8	144	5.7	64.5	7.5	31.8	ND (5.9)	52.6	16.5	ND (5.1)	6.8	ND (5.1)	ND (5.2)	1,900
pH (EPA 9045)	Std. Units	6.1	5.6	6	6.7	6.1	6.6	6.8	5.9	5.6	6	5.3	6	6.3	6.6	6.2	6.6	6.6	6	NS
Chloride (SM 4500-Cl-E)	mg/L	ND (3.0)[3]	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	3	3	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	NS
Surfactants (MBAS SM 5540C)	mg/L	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	0.19	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	NS
Diesel Components (DRO EPA 8015B Mod)	mg/kg	13.3	ND (7.3)	ND (7.6)	ND (7.5)	ND (7.5)	8	ND (7.5)	ND (7.5)	ND (7.5)	ND (7.5)	ND (7.5)	ND (7.1)	ND (7.3)	ND (7.3)	ND (7.3)	ND (7.1)	ND (7.1)	ND (7.4)	NS
TPH (C06-C10) (GRO EPA 8015B Mod)	mg/kg	ND (9.2)	ND (10.1)	ND (10.7)	ND (10.0)	ND (10.2)	ND (8.6)	ND (9.2)	ND (9.2)	ND (10.1)	ND (10.2)	ND (9.3)	ND (9.8)	ND (10.2)	ND (11.2)	ND (10.1)	ND (10.3)	ND (9.7)	ND (9.5)	NS
Ethylene Glycol (8015)	mg/kg	ND (10.6)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	ND (10.5)	1,400
Metals (6010B/7471)																				
Aluminum	mg/kg	12,200	9,610	12,900	10,300	10,100	13,200	12,400	11,500	13,400	11,900	11,600	11,400	12,900	12,700	12,200	11,000	9,160	12,200	190,000
Antimony	mg/kg	ND (0.45)	ND (0.52)	ND (0.40)	0.85	ND (0.43)	0.59	ND (0.46)	0.4	1.1	0.69	0.86	0.74	ND (0.31)	ND (0.36)	ND (0.47)	ND (0.26)	ND (0.32)	ND (0.43)	27
Arsenic	mg/kg	10.5	8.4	7.2	8.2	6	7.3	7.9	8.4	10.1	9.2	6.3	9.6	8.3	6.8	8.2	8.6	7.4	8.5	12
Barium	mg/kg	144	108	91.8	119	121	134	164	137	87	143	71.7	132	122	128	139	149	83.8	132	8,200
Beryllium	mg/kg	0.62	0.52	0.58	0.61	0.45	0.64	0.63	0.7	0.67	0.72	0.6	0.66	0.63	0.68	0.6	0.59	0.59	0.73	320
Boron	mg/kg	7.7	6.7	7.1	7.5	6.2	8.4	6.4	6.4	6.8	6.7	6.7	7.3	7.7	7.8	8.7	7.6	7.1	8.8	1,900
Cadmium	mg/kg	0.41	0.25	0.38	0.44	0.32	0.32	0.32	0.33	0.24	0.22	0.31	0.38	0.35	0.38	0.28	0.41	0.31	0.4	38
Calcium	mg/kg	932	1120	667	1070	1220	1120	1120	1130	543	1130	508	1080	1010	1230	1350	1460	1380	1220	NS
Chromium	mg/kg	14.5	12.3	14.4	12.6	10.9	16.4	13.9	14.2	16.1	14.3	15	14.4	15.1	15.8	15.5	13.8	12.6	15.2	190,000[4]
Cobalt	mg/kg	11.8	9.9	12.1	12.9	7.3	9.9	11	12.1	10.3	12.3	11.3	11.4	11.4	11	11.5	11.5	9.7	12.3	50
Copper	mg/kg	13.1	12.5	8.7	16.1	9.3	17.7	14.3	19.8	11.2	25.9	12.9	16.9	13.2	18.4	17.3	17	13.8	19.8	8,100
Iron	mg/kg	26,700	21,000	25,500	23,500	17,000	26,100	24,000	25,500	28,400	25,900	26,500	25,700	26,900	25,300	26,500	25,000	22,400	27,500	150,000
Lead	mg/kg	16.8	8.8	12.4	12.4	13.6	10.4	13.1	11.5	12.2	13.8	9	12.5	12.5	11	14	12.2	8.3	12.3	450
Magnesium	mg/kg	3,320	3,200	2,870	3,370	2,120	3,990	3,280	3,820	3,480	3,970	3,910	3,700	3,590	3,980	4,080	3,860	3,310	4,100	NS
Manganese	mg/kg	579	545	631	739	758	515	640	586	597	680	608	558	503	525	513	568	500	706	2,000
Molybdenum	mg/kg	ND (1.3)	ND (2.1)	ND (1.6)	ND (1.5)	ND (1.7)	ND (1.5)	ND (1.8)	ND (1.3)	ND (2.3)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.3)	ND (1.2)	ND (1.9)	ND (1.4)	ND (1.3)	ND (1.7)	650
Nickel	mg/kg	17.8	18.5	14.5	21.4	10.9	21.8	18.3	22.8	18.3	24.4	23.1	21.9	18.9	22.5	24	22.6	20.9	24.1	650
Potassium	mg/kg	1,260	1,290	1,260	1,490	1,180	1,650	1,560	1,710	1,380	1,740	1,370	1,630	1,590	1,850	1,940	1,670	1,520	2,000	NS
Selenium	mg/kg	ND (0.45)	ND (0.52)	ND (0.40)	ND (0.47)	ND (0.43)	ND (0.43)	ND (0.46)	ND (0.33)	ND (0.57)	ND (0.43)	ND (0.43)	ND (0.42)	ND (0.31)	ND (0.36)	ND (0.47)	ND (0.38)	ND (0.32)	ND (0.43)	26
Silver	mg/kg	0.53	0.46	0.55	0.5	0.48	0.4	ND (0.18)	ND (0.13)	ND (0.23)	ND (0.17)	ND (0.17)	0.23	0.28	0.25	0.28	0.24	0.22	0.28	84
Sodium	mg/kg	ND (746)	ND (525)	ND (490)	ND (474)	ND (433)	ND (497)	ND (482)	ND (333)	ND (587)	ND (431)	ND (428)	ND (415)	ND (314)	ND (302)	ND (465)	ND (358)	ND (316)	ND (425)	NS
Thallium	mg/kg	ND (1.8)	ND (2.1)	ND (1.6)	ND (1.9)	ND (1.7)	ND (1.5)	ND (1.8)	ND (1.3)	ND (2.3)	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.3)	ND (1.2)	ND (1.9)	ND (1.4)	ND (1.3)	ND (1.7)	14
Vanadium	mg/kg	18.7	12.7	19.4	14.6	16.4	20.5	18.1	15.3	21.1	15.4	14.4	16.1	19.1	16.1	16.6	14.2	13.1	16.1	1,500
Zinc	mg/kg	53.8	46.1	49.5	51.5	53.5	69	55.5	55.7	52.8	57.8	58.7	50.7	53.9	56.4	59.4	59.5	48.3	59.4	12,000
Mercury	mg/kg	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.10)	ND (0.11)	ND (0.10)	ND (0.11)	ND (0.10)	ND (0.11)	ND (0.10)	ND (0.10)	10
VOCs (8260)																				
1,1,1-Trichloroethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	60
1,2-Dichloroethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0084)	ND (0.0094)	ND (0.0114)	ND (0.0098)	ND (0.0086)	ND (0.0076)	ND (0.009)	ND (0.0094)	ND (0.0094)	ND (0.0092)	ND (0.009)	ND (0.0092)	ND (0.009)	ND (0.009)	ND (0.009)	ND (0.0902)	ND (0.0104)	ND (0.009)	7^5
1,2-Dichloropropane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	10
2-Butanone (MEK)	mg/kg	ND (0.0084)	ND (0.0094)	ND (0.0114)	ND (0.0098)	ND (0.0086)	ND (0.0076)	0.0108	ND (0.0094)	ND (0.0094)	ND (0.0092)	0.0104	ND (0.0092)	ND (0.009)	ND (0.009)	ND (0.009)	ND (0.0902)	ND (0.0104)	ND (0.009)	400
2-Hexanone	mg/kg	ND (0.0084)	ND (0.0094)	ND (0.0114)	ND (0.0098)	ND (0.0086)	ND (0.0076)	ND (0.009)	ND (0.0094)	ND (0.0094)	ND (0.0092)	ND (0.009)	ND (0.0092)	ND (0.009)	ND (0.009)	ND (0.009)	ND (0.0902)	ND (0.0104)	ND (0.009)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0084)	ND (0.0094)	ND (0.0114)	ND (0.0098)	ND (0.0086)	ND (0.0076)	ND (0.009)	ND (0.0094)	ND (0.0094)	ND (0.0092)	ND (0.009)	ND (0.0092)	ND (0.009)	ND (0.009)	ND (0.009)	ND (0.0902)	ND (0.0104)	ND (0.009)	290
Acetone	mg/kg	0.0529	0.0248	0.119	0.0112	0.055	0.0292	0.0808	0.0859	0.106	0.105	0.0778	0.106	0.047	0.105	0.0110	0.0201	0.0119	0.0239	3,300
Benzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
Bromodichloromethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	8
Bromoform	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	8
Bromomethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	1
Carbon disulfide	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	150
Carbon tetrachloride	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
Chlorobenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	10
Chloroethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	23
Chloroform	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	8
Chloromethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.66
Dibromochloromethane	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	8
Ethylbenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	600
m&p-Xylene	mg/kg	ND (0.0084)	ND (0.0094)	ND (0.0114)	ND (0.0098)	ND (0.0086)	ND (0.0076)	ND (0.009)	ND (0.0094)	ND (0.0094)	ND (0.0092)	ND (0.009)	ND (0.0092)	ND (0.009)	ND (0.009)	ND (0.009)	ND (0.0902)	ND (0.0104)	ND (0.009)	1,000[6]
Methylene Chloride	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	2
Naphthalene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	25
n-Butylbenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	950
n-Propylbenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	290
o-Xylene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	1,000[6]
p-Isopropyltoluene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	NS
sec-Butylbenzene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	350
Styrene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	24
Tetrachloroethene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
Toluene	mg/kg	0.0198	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	0.0225	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	100
TOTAL BTEX	mg/kg	ND (0.0252)	ND (0.025)	ND (0.0342)	ND (0.0294)	ND (0.0258)	ND (0.0228)	ND (0.027)	ND (0.0282)	ND (0.0282)	ND (0.0276)	ND (0.027)	ND (0.0276)	ND (0.027)	ND (0.027)	ND (0.027)	ND (0.0271)	ND (0.0313)	ND (0.027)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.66
Trichloroethene	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.5
Vinyl chloride	mg/kg	ND (0.0042)	ND (0.0047)	ND (0.0057)	ND (0.0049)	ND (0.0043)	ND (0.0038)	ND (0.0045)	ND (0.0047)	ND (0.0047)	ND (0.0046)	ND (0.0045)	ND (0.0046)	ND (0.0045)	ND (0.0045)	ND (0.0045)	ND (0.00451)	ND (0.00521)	ND (0.0045)	0.2
Xylene (Total)	mg/kg	ND (0.0126)	ND (0.0141)	ND (0.0171)	ND (0.0147)	ND (0.0129)	ND (0.0114)	ND (0.0135)	ND (0.0141)	ND (0.0141)	ND (0.0138)	ND (0.0135)	ND (0.0138)	ND (0.0135)	ND (0.0135)	ND (0.0135)	ND (0.0135)	ND (0.0156)	ND (0.0135)	1,000

Table 4.2-1
Test Pit Analytical Results for Soil
Brooks 1H Wellsite

Dimock Township
Susquehana County, PA

Location / Sample Identification / Sample Date / Parameter	Units	Brooks 1H BRK-1H-P1A 5/25/2010	Brooks 1H BRK-1H-P1B 5/25/2010	Brooks 1H BRK-1H-P2A 5/25/2010	Brooks 1H BRK-1H-P2B 5/25/2010	Brooks 1H BRK-1H-P3A 5/25/2010	Brooks 1H BRK-1H-P3B 5/25/2010	Brooks 1H BRK-1H-P4A 5/25/2010	Brooks 1H BRK-1H-P4B 5/25/2010	Brooks 1H BRK-1H-P5A 5/25/2010	Brooks 1H BRK-1H-P5B 5/25/2010	Brooks 1H BRK-1H-P6A 5/25/2010	Brooks 1H BRK-1H-P6B 5/25/2010	Brooks 1H BRK-1H-P7A 5/25/2010	Brooks 1H BRK-1H-P7B 5/25/2010	Brooks 1H BRK-1H-P8A 5/25/2010	Brooks 1H BRK-1H-P8B 5/25/2010	Brooks 1H BRK-1H-P9A 5/25/2010	Brooks 1H BRK-1H-P9B 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOCs (8270)																				
1,2,4-Trichlorobenzene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	27
1,2-Dichlorobenzene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	60
1,3-Dichlorobenzene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	61
1,4-Dichlorobenzene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.93)	ND (0.994)	ND (0.953)	ND (0.919)	ND (0.926)	ND (0.93)	ND (0.958)	ND (0.895)	ND (0.919)	ND (0.928)	ND (0.883)	ND (0.958)	ND (0.958)	ND (0.922)	ND (0.958)	ND (0.963)	ND (0.895)	ND (0.898)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	11
2,4-Dichlorophenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	2
2,4-Dimethylphenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	73
2,4-Dinitrophenol	mg/kg	ND (0.93)	ND (0.994)	ND (0.953)	ND (0.919)	ND (0.926)	ND (0.93)	ND (0.958)	ND (0.895)	ND (0.919)	ND (0.928)	ND (0.883)	ND (0.958)	ND (0.958)	ND (0.922)	ND (0.958)	ND (0.963)	ND (0.895)	ND (0.898)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	3.7
2-Chloronaphthalene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.200
2-Chlorophenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	4.4
2-Methylnaphthalene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	180
2-Nitroaniline	mg/kg	ND (0.93)	ND (0.994)	ND (0.953)	ND (0.919)	ND (0.926)	ND (0.93)	ND (0.958)	ND (0.895)	ND (0.919)	ND (0.928)	ND (0.883)	ND (0.958)	ND (0.958)	ND (0.922)	ND (0.958)	ND (0.963)	ND (0.895)	ND (0.898)	11
2-Nitrophenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.744)	ND (0.796)	ND (0.762)	ND (0.735)	ND (0.741)	ND (0.744)	ND (0.765)	ND (0.719)	ND (0.733)	ND (0.742)	ND (0.705)	ND (0.765)	ND (0.765)	ND (0.737)	ND (0.765)	ND (0.771)	ND (0.716)	ND (0.718)	187
3,3-Dichlorobenzidine	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	8.3
3-Nitroaniline	mg/kg	ND (0.93)	ND (0.994)	ND (0.953)	ND (0.919)	ND (0.926)	ND (0.93)	ND (0.958)	ND (0.895)	ND (0.919)	ND (0.928)	ND (0.883)	ND (0.958)	ND (0.958)	ND (0.922)	ND (0.958)	ND (0.963)	ND (0.895)	ND (0.898)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.93)	ND (0.994)	ND (0.953)	ND (0.919)	ND (0.926)	ND (0.93)	ND (0.958)	ND (0.895)	ND (0.919)	ND (0.928)	ND (0.883)	ND (0.958)	ND (0.958)	ND (0.922)	ND (0.958)	ND (0.963)	ND (0.895)	ND (0.898)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	37
4-Chloroaniline	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	NS
4-Nitroaniline	mg/kg	ND (0.93)	ND (0.994)	ND (0.953)	ND (0.919)	ND (0.926)	ND (0.93)	ND (0.958)	ND (0.895)	ND (0.919)	ND (0.928)	ND (0.883)	ND (0.958)	ND (0.958)	ND (0.922)	ND (0.958)	ND (0.963)	ND (0.895)	ND (0.898)	3.3
4-Nitrophenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	6
Acenaphthene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	2,700
Acenaphthylene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	2,500
Anthracene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	350
Benzo(a)anthracene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	5.7
Benzo(a)pyrene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	180
Benzo(k)fluoranthene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	57
Benzyl alcohol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	130
Butylbenzylphthalate	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	3,000
Chrysene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.57
Dibenzofuran	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	95
Diethylphthalate	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	2,900
Dimethylphthalate	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	NS
Di-n-butylphthalate	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	1,500
Di-n-octylphthalate	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	8,800
Fluoranthene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	3,200
Fluorene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	3,000
Hexachloro-1,3-butadiene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	10
Hexachlorobenzene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	91
Hexachloroethane	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	5.7
Isophorone	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	10
Naphthalene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	25
Nitrobenzene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	7.3
N-Nitroso-di-n-propylamine	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	0.0094
N-Nitrosodiphenylamine	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	20
Pentachlorophenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	5
Phenanthrene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	10,000
Phenol	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	200
Pyrene	mg/kg	ND (0.372)	ND (0.398)	ND (0.381)	ND (0.368)	ND (0.37)	ND (0.372)	ND (0.383)	ND (0.368)	ND (0.367)	ND (0.371)	ND (0.353)	ND (0.383)	ND (0.383)	ND (0.368)	ND (0.383)	ND (0.385)	ND (0.358)	ND (0.359)	2,200

Notes:
[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.
[2]= ND (2.0 C = Parameter not detected at the detection limit specified in parentheses.
[3]=No Standard
[4]=as Chromium III.
[5]=as cis-1, 2 - Dichloroethlene
[6]=as Total xylenes.
[7]=as p-Cresol

29.0 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.2-2
Analytical Results for Surface Water Samples
Brooks 1H Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification *Location* *Sample Date* Parameter	UNITS	BROOKS 1H A *Upgradient* 12/8/2009	Brooks 1H B *Downgradient* 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
General Chemistry						
pH (SM 4500-H+B)	pH units	7.5	7.3	6.0-9.0		NS
TPH (C06-C10) (GRO EPA 8015B Mod)	ug/L	ND (200)[2]	ND (200)	NS[3]	NS	NS
Diesel Components (DRO EPA 8015B Mod)	mg/L	ND (0.10)	ND (0.11)	NS	NS	NS
TPH (EPA 1664A)	mg/L	ND (4.0)	ND (4.9)	NS	NS	NS
Acidity (SM 2310B)	mg/L	ND (10.0)	ND (10.0)	NS	NS	NS
Alkalinity (SM 2320B)	mg/L	28.9	27.6	NS	NS	NS
Ammonia (EPA 350.1)	mg/L	0.41	0.29	NS	NS	NS
TDS (SM 2540C)	mg/L	84	82	NS	NS	750
Chloride (SM 4500-Cl-E)	mg/L	8.2	8.6	NS	NS	250
Metals (6010B/7471)						
Aluminum, Total	ug/L	151	427	NS	750	NS
Antimony, Total	ug/L	ND (5.0)	ND (5.0)	220	1,100	5.6
Arsenic, Total	ug/L	ND (5.0)	ND (5.0)	150	340	10
Barium, Total	ug/L	31.4	39	4,100	21,000	2,400
Beryllium, Total	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Total	ug/L	ND (50.0)	ND (50.0)	1,600	8,100	3,100
Cadmium, Total	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Calcium, Total	ug/L	10,100	10,100	NS	NS	NS
Chromium, Total	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Cobalt, Total	ug/L	ND (5.0)	ND (5.0)	19	95	NS
Copper, Total	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Iron, Total	ug/L	673	1,160	1,500[4]	1,500[4]	NS[4]
Lead, Total	ug/L	ND (2.0)	ND (2.0)	NS	NS	NS
Magnesium, Total	ug/L	1,800	1,880	NS	NS	NS
Manganese, Total	ug/L	217	314	NS	NS	1,000
Molybdenum, Total	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel, Total	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Potassium, Total	ug/L	5,520	5,240	NS	NS	NS
Selenium, Total	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Silver, Total	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Sodium, Total	ug/L	5,570	5,700	NS	NS	NS
Thallium, Total	ug/L	ND (10.0)	ND (10.0)	13	65	0.24
Vanadium, Total	ug/L	ND (5.0)	ND (5.0)	100	510	NS
Zinc, Total	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Mercury, Total	ug/L	ND (0.20)	ND (0.20)	NS	NS	NS
Metals (6010B/7471)						
Aluminum, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Antimony, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Arsenic, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Barium, Dissolved	ug/L	28.7	27.9	NS	NS	NS
Beryllium, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Cadmium, Dissolved	ug/L	ND (1.0)	ND (1.0)	0.25	2.01	NS
Calcium, Dissolved	ug/L	9,630	9,730	NS	NS	NS
Chromium, Dissolved	ug/L	ND (5.0)	ND (5.0)	74.1	569.8	NS
Cobalt, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Copper, Dissolved	ug/L	ND (5.0)	ND (5.0)	9.0	13	NS
Iron, Dissolved	ug/L	284	261	NS	NS	300
Lead, Dissolved	ug/L	ND (2.0)	ND (2.0)	2.5	64.6	NS
Magnesium, Dissolved	ug/L	1,780	1,800	NS	NS	NS
Manganese, Dissolved	ug/L	180	172	NS	NS	NS
Molybdenum, Dissolved	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel, Dissolved	ug/L	ND (10.0)	ND (10.0)	52	470	610
Potassium, Dissolved	ug/L	5,340	5,260	NS	NS	NS
Selenium, Dissolved	ug/L	ND (5.0)	ND (5.0)	4.6	NS	NS
Silver, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	3.2	NS
Sodium, Dissolved	ug/L	5,970	5,860	NS	NS	NS
Thallium, Dissolved	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Vanadium, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Zinc, Dissolved	ug/L	ND (10.0)	ND (10.0)	120	120	NS
Mercury, Dissolved	ug/L	ND (0.20)	ND (0.20)	0.77	1.4	0.05

Table 4.2-2
Analytical Results for Surface Water Samples
Brooks 1H Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification Location Sample Date Parameter	UNITS	BROOKS 1H A Upgradient 12/8/2009	Brooks 1H B Downgradient 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
VOCs (8260)						
1,1,1-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	610	3,000	NS
1,1,2,2-Tetrachloroethane	ug/L	ND (1.0)	ND (1.0)	210	1,000	0.17
1,1,2-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	680	3,400	0.59
1,1-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,1-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,500	7,500	33
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.0)	26	130	35
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	160	820	420
1,2-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	3,100	15,000	0.38
1,2-Dichloroethene (Total)	ug/L	ND (2.0)	ND (2.0)	NS	NS	NS
1,2-Dichloropropane	ug/L	ND (1.0)	ND (1.0)	2,200	11,000	NS
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	150	730	420
2-Butanone (MEK)	ug/L	ND (10.0)	ND (10.0)	32,000	230,000	21,000
2-Hexanone	ug/L	ND (10.0)	ND (10.0)	4,300	21,000	NS
4-Methyl-2-pentanone (MIBK)	ug/L	ND (10.0)	ND (10.0)	5,000	26,000	NS
Acetone	ug/L	ND (10.0)	ND (10.0)	86,000	450,000	3,500
Benzene	ug/L	ND (1.0)	ND (1.0)	130	640	1.2
Bromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Bromodichloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.55
Bromoform	ug/L	ND (1.0)	ND (1.0)	370	1,800	4.3
Bromomethane	ug/L	ND (1.0)	ND (1.0)	110	550	47
Carbon disulfide	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon tetrachloride	ug/L	ND (1.0)	ND (1.0)	560	2,800	0.23
Chlorobenzene	ug/L	ND (1.0)	ND (1.0)	240	1,200	130
Chloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Chloroform	ug/L	ND (1.0)	ND (1.0)	390	1,900	5.7
Chloromethane	ug/L	ND (1.0)	ND (1.0)	5,500	28,000	NS
cis-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
cis-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
Dibromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.4
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	580	2,900	530
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
m&p-Xylene	ug/L	ND (2.0)	ND (2.0)	210[5]	1,100[5]	70,000[5]
Methylene Chloride	ug/L	ND (1.0)	ND (1.0)	2,400	12,000	4.6
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (2.0)	ND (2.0)	43	140	NS
n-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
n-Propylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
o-Xylene	ug/L	ND (1.0)	ND (1.0)	210[5]	1,100[5]	70,000[5]
p-Isopropyltoluene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
sec-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Styrene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Tetrachloroethene	ug/L	ND (1.0)	ND (1.0)	140	700	0.69
Toluene	ug/L	ND (1.0)	ND (1.0)	330	1,700	1,300
trans-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,400	6,800	140
trans-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
Trichloroethene	ug/L	ND (1.0)	ND (1.0)	450	2,300	2.5
Vinyl Chloride	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.025
Xylene (Total)	ug/L	ND (3.0)	ND (3.0)	210	1,100	70,000

Table 4.2-2
Analytical Results for Surface Water Samples
Brooks 1H Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification *Location* *Sample Date* Parameter	UNITS	BROOKS 1H A *Upgradient* 12/8/2009	Brooks 1H B *Downgradient* 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs (8270C)						
1,2,4-Trichlorobenzene	ug/L	ND (1.1)	ND (1.0)	26	130	35
1,2-Dichlorobenzene	ug/L	ND (1.1)	ND (1.0)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.1)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.1)	ND (1.0)	150	730	420
1-Methylnaphthalene	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
2,4,5-Trichlorophenol	ug/L	ND (2.7)	ND (2.5)	NS	NS	NS
2,4,6-Trichlorophenol	ug/L	ND (1.1)	ND (1.0)	91	460	1.4
2,4-Dichlorophenol	ug/L	ND (1.1)	ND (1.0)	340	1,700	77
2,4-Dimethylphenol	ug/L	ND (1.1)	ND (1.0)	130	660	380
2,4-Dinitrophenol	ug/L	ND (2.7)	ND (2.5)	320	1,600	0.05
2,4-Dinitrotoluene	ug/L	ND (1.1)	ND (1.0)	130	660	69
2,6-Dinitrotoluene	ug/L	ND (1.1)	ND (1.0)	200	990	0.05
2-Chloronaphthalene	ug/L	ND (1.1)	ND (1.0)	NS	NS	1,000
2-Chlorophenol	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
2-Methylnaphthalene	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
2-Methylphenol(o-Cresol)	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
2-Nitroaniline	ug/L	ND (2.7)	ND (2.5)	NS	NS	NS
2-Nitrophenol	ug/L	ND (1.1)	ND (1.0)	1,600	8,000	NS
3&4-Methylphenol(m&p Cresol)	ug/L	ND (2.2)	ND (2.0)	NS	NS	NS
3,3'-Dichlorobenzidine	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
3-Nitroaniline	ug/L	ND (2.7)	ND (2.5)	NS	NS	NS
4,6-Dinitro-2-methylphenol	ug/L	ND (2.7)	ND (2.5)	16	80	13
4-Bromophenylphenyl ether	ug/L	ND (1.1)	ND (1.0)	54	270	NS
4-Chloro-3-methylphenol	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
4-Chloroaniline	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
4-Chlorophenylphenyl ether	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
4-Nitroaniline	ug/L	ND (2.7)	ND (2.5)	NS	NS	NS
4-Nitrophenol	ug/L	ND (1.1)	ND (1.0)	470	2,300	NS
Acenaphthene	ug/L	ND (1.1)	ND (1.0)	17	83	670
Acenaphthylene	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
Anthracene	ug/L	ND (1.1)	ND (1.0)	NS	NS	8,300
Azobenzene	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
Benzo(a)anthracene	ug/L	ND (1.1)	ND (1.0)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (1.1)	ND (1.0)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (1.1)	ND (1.0)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (1.1)	ND (1.0)	NS	NS	0.0038
Benzoic acid	ug/L	ND (10.9)	ND (10.2)	NS	NS	NS
Benzyl alcohol	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
bis(2-Chloroethoxy)methane	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
bis(2-Chloroethyl) ether	ug/L	ND (1.1)	ND (1.0)	6,000	30,000	0.03
bis(2-Chloroisopropyl) ether	ug/L	ND (1.1)	ND (1.0)	NS	NS	1400
bis(2-Ethylhexyl)phthalate	ug/L	ND (1.1)	ND (1.0)	910	4,500	1.2
Butylbenzylphthalate	ug/L	ND (1.1)	ND (1.0)	35	140	150
Carbazole	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
Chrysene	ug/L	ND (1.1)	ND (1.0)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.0038
Dibenzofuran	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
Diethylphthalate	ug/L	ND (1.1)	ND (1.0)	800	4,000	17,000
Dimethylphthalate	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
Di-n-butylphthalate	ug/L	ND (1.1)	ND (1.0)	21	110	2,000
Di-n-octylphthalate	ug/L	ND (1.1)	ND (1.0)	NS	NS	NS
Fluoranthene	ug/L	ND (1.1)	ND (1.0)	40	200	130
Fluorene	ug/L	ND (1.1)	ND (1.0)	NS	NS	1,100

Table 4.2-2
Analytical Results for Surface Water Samples
Brooks 1H Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification *Location* *Sample Date* Parameter	UNITS	BROOKS 1H A *Upgradient* 12/8/2009	Brooks 1H B *Downgradient* 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs (8270C)						
Hexachloro-1,3-butadiene	ug/L	ND (1.1)	ND (1.0)	2	10	0.44
Hexachlorobenzene	ug/L	ND (1.1)	ND (1.0)	NS	NS	0.00028
Hexachlorocyclopentadiene	ug/L	ND (1.1)	ND (1.0)	1	5	40
Hexachloroethane	ug/L	ND (1.1)	ND (1.0)	12	60	1.4
Indeno(1,2,3-cd)pyrene	ug/L	ND (1.1)	ND (1.0)	NS	NS	0.0038
Isophorone	ug/L	ND (1.1)	ND (1.0)	2,100	10,000	35
Naphthalene	ug/L	ND (1.1)	ND (1.0)	43	140	NS
Nitrobenzene	ug/L	ND (1.1)	ND (1.0)	810	4,000	17
N-Nitrosodimethylamine	ug/L	ND (1.1)	ND (1.0)	3,400	17,000	0.00069
N-Nitroso-di-n-propylamine	ug/L	ND (1.1)	ND (1.0)	NS	NS	0.005
N-Nitrosodiphenylamine	ug/L	ND (1.1)	ND (1.0)	59	3,000	3.3
Pentachlorophenol	ug/L	ND (2.7)	ND (2.5)	0.00589	0.00768	0.27
Phenanthrene	ug/L	ND (1.1)	ND (1.0)	1	5	NS
Phenol	ug/L	ND (1.1)	ND (1.0)	NS	NS	21,000
Pyrene	ug/L	ND (1.1)	ND (1.0)	NS	NS	830

Notes:

[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable. Values provided for chromium are for chromium III. Values for chloride, TDS, pH, manganese and Iron from 25 Pa Code Chapter 93.7, Table 3.

[2]= ND (1.0) = Parameter not detected at the detection limit specified in parentheses.

[3]= No Standard.

[4]= The specific water quality criteria for total recoverable iron is for aquatic life uses and is expressed as a 30-day average concentration. The water quality criteria for human health is expressed as dissolved iron. See 25 PA Code Section 93.7.

[5]= As total xylenes.

[5]= As total xylenes.

5.8 = Results exceed SHS R-U MSC and/or applicable surface water quality criteria.

Table 4.3-1
Analytical Results for Soil
W. Chudleigh 1 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification Sample Date Parameter	Units	CHUDLEIGH-1-B1 5/25/2010	CHUDLEIGH-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses				
Percent Moisture (ASTM D2974-87)	%	9.9	9.0	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	ND (5.3)[2]	ND (5.3)	1,900
Chloride (SM 4500-Cl-E)	mg/L	ND (5.0)	ND (5.0)	NS
Surfactants (MBAS SM 5540C)	mg/L	ND (0.10)	ND (0.10)	NS
Ethylene Glycol (EPA 8015)	mg/kg	ND (10.0)	ND (10.0)	1400
Metals Analyses (6010B/7471)				
Aluminum	mg/kg	11,000	13,100	190,000
Antimony	mg/kg	ND (0.52)	ND (0.48)	27
Arsenic	mg/kg	10.2	3.5	12
Barium	mg/kg	136	84.1	8,200
Beryllium	mg/kg	0.65	0.81	320
Boron	mg/kg	5.7	8.6	1,900
Cadmium	mg/kg	ND (0.21)	0.23	38
Calcium	mg/kg	1,350	1,010	NS
Chromium	mg/kg	11.8	16.9	190,000[4]
Cobalt	mg/kg	9.6	11.4	50
Copper	mg/kg	13.2	6.4	8,100
Iron	mg/kg	22,800	31,700	150,000
Lead	mg/kg	9.2	4.9	450
Magnesium	mg/kg	3,420	4,610	NS
Manganese	mg/kg	519	410	2,000
Molybdenum	mg/kg	ND (2.1)	ND (2.0)	650
Nickel	mg/kg	17.8	26.7	650
Potassium	mg/kg	1,790	2,050	NS
Selenium	mg/kg	ND (0.52)	ND (0.48)	26
Silver	mg/kg	0.52	0.93	84
Sodium	mg/kg	ND (524)	ND (481)	NS
Thallium	mg/kg	ND (2.1)	ND (2.0)	14
Vanadium	mg/kg	12.2	16.8	1,500
Zinc	mg/kg	50.2	52.5	12,000
Mercury	mg/kg	ND (0.10)	ND (0.10)	10
VOC Analyses (8260)				
1,1,1-Trichloroethane	mg/kg	ND (0.0052)	ND (0.0057)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0052)	ND (0.0057)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0052)	ND (0.0057)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0052)	ND (0.0057)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0052)	ND (0.0057)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0052)	ND (0.0057)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0052)	ND (0.0057)	60
1,2-Dichloroethane	mg/kg	ND (0.0052)	ND (0.0057)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0105)	ND (0.0114)	7[5]
1,2-Dichloropropane	mg/kg	ND (0.0052)	ND (0.0057)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0052)	ND (0.0057)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0052)	ND (0.0057)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0052)	ND (0.0057)	10
2-Butanone (MEK)	mg/kg	ND (0.0105)	ND (0.0114)	400
2-Hexanone	mg/kg	ND (0.0105)	ND (0.0114)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0105)	ND (0.0114)	290

Table 4.3-1
Analytical Results for Soil
W. Chudleigh 1 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification Sample Date Parameter	Units	CHUDLEIGH-1-B1 5/25/2010	CHUDLEIGH-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
VOC Analyses (8260)				
Acetone	mg/kg	ND (0.0105)	ND (0.0114)	3,300
Benzene	mg/kg	ND (0.0052)	ND (0.0057)	0.5
Bromodichloromethane	mg/kg	ND (0.0052)	ND (0.0057)	8
Bromoform	mg/kg	ND (0.0052)	ND (0.0057)	8
Bromomethane	mg/kg	ND (0.0052)	ND (0.0057)	1
Carbon disulfide	mg/kg	ND (0.0052)	ND (0.0057)	150
Carbon tetrachloride	mg/kg	ND (0.0052)	ND (0.0057)	0.5
Chlorobenzene	mg/kg	ND (0.0052)	ND (0.0057)	10
Chloroethane	mg/kg	ND (0.0052)	ND (0.0057)	23
Chloroform	mg/kg	ND (0.0052)	ND (0.0057)	8
Chloromethane	mg/kg	ND (0.0052)	ND (0.0057)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0052)	ND (0.0057)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0052)	ND (0.0057)	0.66
Dibromochloromethane	mg/kg	ND (0.0052)	ND (0.0057)	8
Ethylbenzene	mg/kg	ND (0.0052)	ND (0.0057)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0052)	ND (0.0057)	600
m&p-Xylene	mg/kg	ND (0.0105)	ND (0.0114)	1,000[5]
Methylene Chloride	mg/kg	ND (0.0052)	ND (0.0057)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0052)	ND (0.0057)	2
Naphthalene	mg/kg	ND (0.0052)	ND (0.0057)	25
n-Butylbenzene	mg/kg	ND (0.0052)	ND (0.0057)	950
n-Propylbenzene	mg/kg	ND (0.0052)	ND (0.0057)	290
o-Xylene	mg/kg	ND (0.0052)	ND (0.0057)	1,000[5]
p-Isopropyltoluene	mg/kg	ND (0.0052)	ND (0.0057)	NS
sec-Butylbenzene	mg/kg	ND (0.0052)	ND (0.0057)	350
Styrene	mg/kg	ND (0.0052)	ND (0.0057)	24
Tetrachloroethene	mg/kg	ND (0.0052)	ND (0.0057)	0.5
Toluene	mg/kg	ND (0.0052)	ND (0.0057)	100
TOTAL BTEX	mg/kg	ND (0.0314)	ND (0.0341)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0052)	ND (0.0057)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0052)	ND (0.0057)	0.66
Trichloroethene	mg/kg	ND (0.0052)	ND (0.0057)	0.5
Vinyl chloride	mg/kg	ND (0.0052)	ND (0.0057)	0.2
Xylene (Total)	mg/kg	ND (0.0157)	ND (0.0170)	1,000
SVOC Analyses (8270)				
1,2,4-Trichlorobenzene	mg/kg	ND (0.368)	ND (0.369)	27
1,2-Dichlorobenzene	mg/kg	ND (0.368)	ND (0.369)	60
1,3-Dichlorobenzene	mg/kg	ND (0.368)	ND (0.369)	61
1,4-Dichlorobenzene	mg/kg	ND (0.368)	ND (0.369)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.919)	ND (0.907)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.368)	ND (0.369)	11
2,4-Dichlorophenol	mg/kg	ND (0.368)	ND (0.369)	2
2,4-Dimethylphenol	mg/kg	ND (0.368)	ND (0.369)	73
2,4-Dinitrophenol	mg/kg	ND (0.919)	ND (0.907)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.368)	ND (0.369)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.368)	ND (0.369)	3.7
2-Chloronaphthalene	mg/kg	ND (0.368)	ND (0.369)	6,200
2-Chlorophenol	mg/kg	ND (0.368)	ND (0.369)	4.4
2-Methylnaphthalene	mg/kg	ND (0.368)	ND (0.369)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.368)	ND (0.369)	180
2-Nitroaniline	mg/kg	ND (0.919)	ND (0.907)	11
2-Nitrophenol	mg/kg	ND (0.368)	ND (0.369)	29

Table 4.3-1
Analytical Results for Soil
W. Chudleigh 1 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification Sample Date Parameter	Units	CHUDLEIGH-1-B1 5/25/2010	CHUDLEIGH-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOC Analyses (8270)				
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.735)	ND (0.726)	18'
3,3'-Dichlorobenzidine	mg/kg	ND (0.368)	ND (0.363)	8.3
3-Nitroaniline	mg/kg	ND (0.919)	ND (0.907)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.919)	ND (0.907)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.368)	ND (0.363)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.368)	ND (0.363)	37
4-Chloroaniline	mg/kg	ND (0.368)	ND (0.363)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.368)	ND (0.363)	NS
4-Nitroaniline	mg/kg	ND (0.919)	ND (0.907)	3.3
4-Nitrophenol	mg/kg	ND (0.368)	ND (0.363)	6
Acenaphthene	mg/kg	ND (0.368)	ND (0.363)	2,700
Acenaphthylene	mg/kg	ND (0.368)	ND (0.363)	2,500
Anthracene	mg/kg	ND (0.368)	ND (0.363)	350
Benzo(a)anthracene	mg/kg	ND (0.368)	ND (0.363)	5.7
Benzo(a)pyrene	mg/kg	ND (0.368)	ND (0.363)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.368)	ND (0.363)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.368)	ND (0.363)	180
Benzo(k)fluoranthene	mg/kg	ND (0.368)	ND (0.363)	57
Benzyl alcohol	mg/kg	ND (0.368)	ND (0.363)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.368)	ND (0.363)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.368)	ND (0.363)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.368)	ND (0.363)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.368)	ND (0.363)	130
Butylbenzylphthalate	mg/kg	ND (0.368)	ND (0.363)	3,000
Chrysene	mg/kg	ND (0.368)	ND (0.363)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.368)	ND (0.363)	0.57
Dibenzofuran	mg/kg	ND (0.368)	ND (0.363)	95
Diethylphthalate	mg/kg	ND (0.368)	ND (0.363)	2900
Dimethylphthalate	mg/kg	ND (0.368)	ND (0.363)	NS
Di-n-butylphthalate	mg/kg	ND (0.368)	ND (0.363)	1500
Di-n-octylphthalate	mg/kg	ND (0.368)	ND (0.363)	8,800
Fluoranthene	mg/kg	ND (0.368)	ND (0.363)	3,200
Fluorene	mg/kg	ND (0.368)	ND (0.363)	3,000
Hexachloro-1,3-butadiene	mg/kg	ND (0.368)	ND (0.363)	10
Hexachlorobenzene	mg/kg	ND (0.368)	ND (0.363)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.368)	ND (0.363)	91
Hexachloroethane	mg/kg	ND (0.368)	ND (0.363)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.368)	ND (0.363)	5.7
Isophorone	mg/kg	ND (0.368)	ND (0.363)	10
Naphthalene	mg/kg	ND (0.368)	ND (0.363)	25
Nitrobenzene	mg/kg	ND (0.368)	ND (0.363)	7.3
N-Nitroso-di-n-propylamine	mg/kg	ND (0.368)	ND (0.363)	0.0094
N-Nitrosodiphenylamine	mg/kg	ND (0.368)	ND (0.363)	20
Pentachlorophenol	mg/kg	ND (0.919)	ND (0.907)	5
Phenanthrene	mg/kg	ND (0.368)	ND (0.363)	10,000
Phenol	mg/kg	ND (0.368)	ND (0.363)	200
Pyrene	mg/kg	ND (0.368)	ND (0.363)	2,200

Notes:

[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.

[2]= ND (5.3) = Parameter not detected at the detection limit specified in parentheses.

[3]=No Standard

[4]=as Chromium III.

[5]=as cis-1, 2 - Dichloroethlene

[6]=as Total xylenes.

[7]=as p-Cresol

12.5 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.3-2
Analytical Results for Surface Water
W. Chudleigh 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification *Sample Location* Sample Date Parameter	UNITS	Chud-DN *Downgradient* 5/26/2010	Chud-UP *Upgradient* 5/26/2010	Surface Water Quality Criteria[1] Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
General Chemistry						
pH	pH units	7.6	7.6	6.0-9.0		NS[3]
Diesel Components (DRO EPA 8015B Mod)	mg/L	ND (0.11)[2]	ND (0.11)	NS[3]	NS	NS
TPH (C06-C10) (GRO EPA 8015B Mod)	mg/L	ND (0.200)	ND (0.200)	NS	NS	NS
Oil and Grease (EPA 1664A)	mg/L	ND (4.8)	ND (5.0)	NS	NS	NS
TPH (EPA 1664A)	mg/L	ND (4.8)	ND (4.8)	NS	NS	NS
Acidity (SM 2310B)	mg/L	ND (10.0)	ND (10.0)	NS	NS	NS
Alkalinity (SM 2320B)	mg/L	36.0	42.0	NS	NS	NS
Ammonia (EPA 350.1)	mg/L	ND (0.10)	ND (0.10)	NS	NS	NS
Ethylene Glycol (EPA 8015)	mg/L	ND (10.0)	ND (10.0)	NS	NS	NS
TDS (SM 2540C)	mg/L	106	89.0	NS	NS	750
Surfactants (MBAS SM 5540C)	mg/L	ND (0.10)	ND (0.10)	NS	NS	NS
Chloride (SM 4500-Cl-E)	mg/L	4.8	4.6	NS	NS	250
Total Metals Analyses (6010/7470)						
Aluminum, Total	ug/L	1480	291	NS	750	NS
Antimony, Total	ug/L	ND (5.0)[2]	ND (5.0)	220	1,100	5.6
Arsenic, Total	ug/L	ND (5.0)	ND (5.0)	150	340	10
Barium, Total	ug/L	50.6	34.8	4,100	21,000	2,400
Beryllium, Total	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Total	ug/L	ND (50.0)	ND (50.0)	1,600	8,100	3,100
Cadmium, Total	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Calcium, Total	ug/L	16,900	16,900	NS	NS	NS
Chromium, Total	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Cobalt, Total	ug/L	ND (5.0)	ND (5.0)	19	95	NS
Copper, Total	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Iron, Total	ug/L	2,080	481	1,500[4]	1,500[4]	NS[3]
Lead, Total	ug/L	ND (2.0)	ND (2.0)	NS	NS	NS
Magnesium, Total	ug/L	2,420	2,160	NS	NS	NS
Manganese, Total	ug/L	184	49.8	NS	NS	1,000
Molybdenum, Total	ug/L	ND (20.0)	ND (20.0)	NS	NS	NS
Nickel, Total	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Potassium, Total	ug/L	973	623	NS	NS	NS
Selenium, Total	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Silver, Total	ug/L	1.2	ND (1.0)	NS	NS	NS
Sodium, Total	ug/L	2,390	2,530	NS	NS	NS
Thallium, Total	ug/L	ND (10.0)	ND (10.0)	13	65	0.24
Vanadium, Total	ug/L	ND (5.0)	ND (5.0)	100	510	NS
Zinc, Total	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Mercury, Total	ug/L	ND (0.20)	ND (0.20)	NS	NS	NS
Dissolved Metals Analyses (6010/7470)						
Aluminum, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Antimony, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Arsenic, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Barium, Dissolved	ug/L	30.2	29.7	NS	NS	NS
Beryllium, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Cadmium, Dissolved	ug/L	ND (1.0)	ND (1.0)	0.25	2.01	NS
Calcium, Dissolved	ug/L	16,100	16,500	NS	NS	NS
Chromium, Dissolved	ug/L	ND (5.0)	ND (5.0)	74.1	569.8	NS
Cobalt, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Copper, Dissolved	ug/L	ND (5.0)	ND (5.0)	9.0	13	NS
Iron, Dissolved	ug/L	54.8	60.4	NS	NS	300
Lead, Dissolved	ug/L	ND (2.0)	ND (2.0)	2.5	64.6	NS
Magnesium, Dissolved	ug/L	1,940	1,980	NS	NS	NS
Manganese, Dissolved	ug/L	7.7	6.2	NS	NS	NS
Molybdenum, Dissolved	ug/L	ND (20.0)	ND (20.0)	NS	NS	NS
Nickel, Dissolved	ug/L	ND (10.0)	ND (10.0)	52	470	610
Potassium, Dissolved	ug/L	628	563	NS	NS	NS
Selenium, Dissolved	ug/L	ND (5.0)	ND (5.0)	4.6	NS	NS
Silver, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	3.2	NS
Sodium, Dissolved	ug/L	2,890	2,760	NS	NS	NS
Thallium, Dissolved	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Vanadium, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Zinc, Dissolved	ug/L	ND (10.0)	ND (10.0)	120	120	NS
Mercury, Dissolved	ug/L	ND (0.20)	ND (0.20)	0.77	1.4	0.05

Table 4.3-2
Analytical Results for Surface Water
W. Chudleigh 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification *Sample Location* Sample Date Parameter	UNITS	Chud-DN *Downgradient* 5/26/2010	Chud-UP *Upgradient* 5/26/2010	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
VOCs (8260)						
Acetone	ug/L	ND (10.0)	ND (10.0)	86,000	450,000	3,500
Benzene	ug/L	ND (1.0)	ND (1.0)	130	640	1.2
Bromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Bromodichloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.55
Bromoform	ug/L	ND (1.0)	ND (1.0)	370	1800	4.3
Bromomethane	ug/L	ND (1.0)	ND (1.0)	110	550	47
2-Butanone (MEK)	ug/L	ND (10.0)	ND (10.0)	32,000	230,000	21,000
n-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
sec-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon disulfide	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon tetrachloride	ug/L	ND (1.0)	ND (1.0)	560	2,800	0.23
Chlorobenzene	ug/L	ND (1.0)	ND (1.0)	240	1,200	130
Chloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Chloroform	ug/L	ND (1.0)	ND (1.0)	390	1,900	5.7
Chloromethane	ug/L	ND (1.0)	ND (1.0)	5,500	28,000	NS
Dibromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.4
1,2-Dibromoethane (EDB)	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	150	730	420
1,1-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	3,100	15,000	0.38
1,2-Dichloroethene (Total)	ug/L	ND (2.0)	ND (2.0)	NS	NS	NS
1,1-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,500	7,500	33
cis-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
trans-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,400	6,800	140
1,2-Dichloropropane	ug/L	ND (1.0)	ND (1.0)	2,200	11,000	NS
cis-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
trans-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	580	2,900	530
2-Hexanone	ug/L	ND (10.0)	ND (10.0)	4,300	21,000	NS
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
p-Isopropyltoluene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Methylene Chloride	ug/L	ND (1.0)	ND (1.0)	2,400	12,000	4.6
4-Methyl-2-pentanone (MIBK)	ug/L	ND (10.0)	ND (10.0)	5,000	26,000	NS
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (2.0)	ND (2.0)	43	140	NS
o-Xylene	ug/L	ND (1.0)	ND (1.0)	210[6]	1,100[5]	70,000[5]
n-Propylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Styrene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,1,2,2-Tetrachloroethane	ug/L	ND (1.0)	ND (1.0)	210	1,000	0.17
Tetrachloroethene	ug/L	ND (1.0)	ND (1.0)	140	700	0.69
Toluene	ug/L	ND (1.0)	ND (1.0)	330	1,700	1,300
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.0)	28	130	35
1,1,1-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	610	3,000	NS
1,1,2-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	680	3,400	0.59
Trichloroethene	ug/L	ND (1.0)	ND (1.0)	450	2,300	2.5
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Vinyl Chloride	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.025
Xylene (Total)	ug/L	ND (3.0)	ND (3.0)	210	1,100	70,000
m&p-Xylene	ug/L	ND (2.0)	ND (2.0)	210[5]	1,100[5]	70,000[5]

Table 4.3-2
Analytical Results for Surface Water
W. Chudleigh 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification *Sample Location* Sample Date Parameter	UNITS	Chud-DN *Downgradient* 5/26/2010	Chud-UP *Upgradient* 5/26/2010	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs (8270C)						
2-Methylphenol(o-Cresol)	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
3&4-Methylphenol(m&p Cresol)	ug/L	ND (1.2)	ND (2.1)	NS	NS	NS
Acenaphthene	ug/L	ND (1.2)	ND (1.0)	17	83	670
Acenaphthylene	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
Anthracene	ug/L	ND (1.2)	ND (1.0)	NS	NS	8300
Azobenzene	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
Benzo(a)anthracene	ug/L	ND (1.2)	ND (1.0)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.0038
Benzoic acid	ug/L	ND (10.8)	ND (10.3)	NS	NS	NS
Benzyl alcohol	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
4-Bromophenylphenyl ether	ug/L	ND (1.2)	ND (1.0)	54	270	NS
Butylbenzylphthalate	ug/L	ND (1.2)	ND (1.0)	35	140	150
Carbazole	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
4-Chloro-3-methylphenol	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
4-Chloroaniline	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
bis(2-Chloroethoxy)methane	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
bis(2-Chloroethyl) ether	ug/L	ND (1.2)	ND (1.0)	6,000	30,000	0.03
bis(2-Chloroisopropyl) ether	ug/L	ND (1.2)	ND (1.0)	NS	NS	1,400
2-Chloronaphthalene	ug/L	ND (1.2)	ND (1.0)	NS	NS	1,000
2-Chlorophenol	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
4-Chlorophenylphenyl ether	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
Chrysene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.0038
Dibenzofuran	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.2)	ND (1.0)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.2)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.2)	ND (1.0)	150	730	420
3,3'-Dichlorobenzidine	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
2,4-Dichlorophenol	ug/L	ND (1.2)	ND (1.0)	340	1,700	77
Diethylphthalate	ug/L	ND (1.2)	ND (1.0)	800	4,000	17,000
2,4-Dimethylphenol	ug/L	ND (1.2)	ND (1.0)	130	660	380
Dimethylphthalate	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
Di-n-butylphthalate	ug/L	ND (1.2)	ND (1.0)	21	110	2,000
4,6-Dinitro-2-methylphenol	ug/L	ND (3.0)	ND (2.8)	16	80	13
2,4-Dinitrophenol	ug/L	ND (3.0)	ND (2.5)	320	1,600	0.05
2,4-Dinitrotoluene	ug/L	ND (1.2)	ND (1.0)	130	660	69
2,6-Dinitrotoluene	ug/L	ND (1.2)	ND (1.0)	200	990	0.05
Di-n-octylphthalate	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
bis(2-Ethylhexyl)phthalate	ug/L	ND (1.2)	ND (1.0)	910	4,500	1.2
Fluoranthene	ug/L	ND (1.2)	ND (1.0)	40	200	130
Fluorene	ug/L	ND (1.2)	ND (1.0)	NS	NS	1,100
Hexachloro-1,3-butadiene	ug/L	ND (1.2)	ND (1.0)	2	10	0.44
Hexachlorobenzene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.00028
Hexachlorocyclopentadiene	ug/L	ND (1.2)	ND (1.0)	1	5	40
Hexachloroethane	ug/L	ND (1.2)	ND (1.0)	12	60	1.4
Indeno(1,2,3-cd)pyrene	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.0038
Isophorone	ug/L	ND (1.2)	ND (1.0)	2,100	10,000	35
1-Methylnaphthalene	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
2-Methylnaphthalene	ug/L	ND (1.2)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (1.2)	ND (1.0)	43	140	NS
2-Nitroaniline	ug/L	ND (3.0)	ND (2.8)	NS	NS	NS

Table 4.3-2
Analytical Results for Surface Water
W. Chudleigh 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification *Sample Location* Sample Date Parameter	UNITS	Chud-DN *Downgradient* 5/26/2010	Chud-UP *Upgradient* 5/26/2010	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs 8270C)						
3-Nitroaniline	ug/L	ND (3.0)	ND (2.6)	NS	NS	NS
4-Nitroaniline	ug/L	ND (3.0)	ND (2.6)	NS	NS	NS
Nitrobenzene	ug/L	ND (1.2)	ND (1.0)	810	4,000	17
2-Nitrophenol	ug/L	ND (1.2)	ND (1.0)	1,600	8,000	NS
4-Nitrophenol	ug/L	ND (1.2)	ND (1.0)	470	2,300	NS
N-Nitrosodimethylamine	ug/L	ND (1.2)	ND (1.0)	3,400	17,000	0.00069
N-Nitroso-di-n-propylamine	ug/L	ND (1.2)	ND (1.0)	NS	NS	0.005
N-Nitrosodiphenylamine	ug/L	ND (1.2)	ND (1.0)	59	3000	3.3
Pentachlorophenol	ug/L	ND (3.0)	ND (2.6)	0.00589	0.00768	0.27
Phenanthrene	ug/L	ND (1.2)	ND (1.0)	1	5	NS
Phenol	ug/L	ND (1.2)	ND (1.0)	NS	NS	21,000
Pyrene	ug/L	ND (1.2)	ND (1.0)	NS	NS	830
1,2,4-Trichlorobenzene	ug/L	ND (1.2)	ND (1.0)	26	130	35
2,4,5-Trichlorophenol	ug/L	ND (3.0)	ND (2.6)	NS	NS	NS
2,4,6-Trichlorophenol	ug/L	ND (1.2)	ND (1.0)	91	460	1.4

Notes:

[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable. Values provided for chromium are for chromium III. Values for chloride, TDS, pH, manganese and Iron from 25 Pa Code Chapter 93.7, Table 3.

[2]= ND (1.0) = Parameter not detected at the detection limit specified in parentheses.

[3]= No Standard.

[4]= The specific water quality criteria for total recoverable iron is for aquatic life uses and is expressed as a 30-day average concentration. The water quality criteria for human health is expressed as dissolved Iron. See 25 PA Code Section 93.7.

[5]= As total xylenes.

[5]= As total xylenes.

5.8 = Results exceed SHS R-U MSC and/or applicable surface water quality criteria.

Table 4.4-1
Analytical Results for Soil
Costello 1 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification Sample Date Parameter	Units	COSTELLO-1-B1 5/25/2010	COSTELLO-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses				
Percent Moisture (ASTM D2974-87)	%	9.1	8.2	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	12.4	7.2	1,900
Chloride (SM 4500-Cl-E)	mg/L	ND (3.0)[2]	ND (3.0)	NS
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.10)	ND (0.10)	NS
Ethylene Glycol (EPA 8015)	mg/kg	ND (10.0)	ND (10.0)	1400
Metals Analyses (6010B/7471)				
Aluminum	mg/kg	12,800	11,700	190,000
Antimony	mg/kg	ND (0.39)	ND (0.38)	27
Arsenic	mg/kg	12.5	10.1	12
Barium	mg/kg	72.3	64.2	8,200
Beryllium	mg/kg	0.6	0.52	320
Boron	mg/kg	7.4	6.5	1900
Cadmium	mg/kg	0.32	0.36	38
Calcium	mg/kg	899	721	NS
Chromium	mg/kg	14.4	12.6	190,000[3]
Cobalt	mg/kg	8.6	9.6	50
Copper	mg/kg	13.4	13.7	8,100
Iron	mg/kg	23,500	22,400	150,000
Lead	mg/kg	13.1	15.5	450
Magnesium	mg/kg	3,820	3,710	NS
Manganese	mg/kg	520	701	2,000
Molybdenum	mg/kg	ND (1.6)	ND (1.5)	650
Nickel	mg/kg	19.3	19.5	650
Potassium	mg/kg	1,450	1,440	NS
Selenium	mg/kg	0.5	ND (0.23)	26
Silver	mg/kg	0.22	0.21	84
Sodium	mg/kg	ND (387)	ND (386)	NS
Thallium	mg/kg	ND (1.3)	ND (1.5)	14
Vanadium	mg/kg	18.1	13.2	1,500
Zinc	mg/kg	58.4	58.6	12,000
Mercury	mg/kg	ND (0.10)	ND (0.10)	10
VOC Analyses (8260)				
1,1,1-Trichloroethane	mg/kg	ND (0.0048)	ND (0.0054)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0048)	ND (0.0054)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0048)	ND (0.0054)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0048)	ND (0.0054)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0048)	ND (0.0054)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0048)	ND (0.0054)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0048)	ND (0.0054)	60
1,2-Dichloroethane	mg/kg	ND (0.0048)	ND (0.0054)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0096)	ND (0.0108)	7[5]
1,2-Dichloropropane	mg/kg	ND (0.0048)	ND (0.0054)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0048)	ND (0.0054)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0048)	ND (0.0054)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0048)	ND (0.0054)	10
2-Butanone (MEK)	mg/kg	ND (0.0096)	ND (0.0108)	400
2-Hexanone	mg/kg	ND (0.0096)	ND (0.0108)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0096)	ND (0.0108)	290
Acetone	mg/kg	0.0311	0.0703	3,300
Benzene	mg/kg	ND (0.0048)	ND (0.0054)	0.5
Bromodichloromethane	mg/kg	ND (0.0048)	ND (0.0054)	8
Bromoform	mg/kg	ND (0.0048)	ND (0.0054)	8
Bromomethane	mg/kg	ND (0.0048)	ND (0.0054)	1
Carbon disulfide	mg/kg	ND (0.0048)	ND (0.0054)	150
Carbon tetrachloride	mg/kg	ND (0.0048)	ND (0.0054)	0.5
Chlorobenzene	mg/kg	ND (0.0048)	ND (0.0054)	10
Chloroethane	mg/kg	ND (0.0048)	ND (0.0054)	23
Chloroform	mg/kg	ND (0.0048)	ND (0.0054)	8
Chloromethane	mg/kg	ND (0.0048)	ND (0.0054)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0048)	ND (0.0054)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0048)	ND (0.0054)	0.66
Dibromochloromethane	mg/kg	ND (0.0048)	ND (0.0054)	8
Ethylbenzene	mg/kg	ND (0.0048)	ND (0.0054)	70

Table 4.4-1
Analytical Results for Soil
Costello 1 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	COSTELLO-1-B1 5/25/2010	COSTELLO-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
VOC Analyses (8260)				
Isopropylbenzene (Cumene)	mg/kg	ND (0.0048)	ND (0.0054)	600
m&p-Xylene	mg/kg	ND (0.0096)	ND (0.0108)	1,000[5]
Methylene Chloride	mg/kg	ND (0.0048)	ND (0.0054)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0048)	ND (0.0054)	2
Naphthalene	mg/kg	ND (0.0048)	ND (0.0054)	25
n-Butylbenzene	mg/kg	ND (0.0048)	ND (0.0054)	950
n-Propylbenzene	mg/kg	ND (0.0048)	ND (0.0054)	290
o-Xylene	mg/kg	ND (0.0048)	ND (0.0054)	1,000[5]
p-Isopropyltoluene	mg/kg	ND (0.0048)	ND (0.0054)	NS
sec-Butylbenzene	mg/kg	ND (0.0048)	ND (0.0054)	350
Styrene	mg/kg	ND (0.0048)	ND (0.0054)	24
Tetrachloroethene	mg/kg	ND (0.0048)	ND (0.0054)	0.5
Toluene	mg/kg	ND (0.0048)	ND (0.0054)	100
TOTAL BTEX	mg/kg	ND (0.0096)	ND (0.0108)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0048)	ND (0.0054)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0048)	ND (0.0054)	0.66
Trichloroethene	mg/kg	ND (0.0048)	ND (0.0054)	0.5
Vinyl chloride	mg/kg	ND (0.0048)	ND (0.0054)	0.2
Xylene (Total)	mg/kg	ND (0.0048)	ND (0.0162)	1,000[5]
SVOC Analyses (8270)				
1,2,4-Trichlorobenzene	mg/kg	ND (0.355)	ND (0.354)	27
1,2-Dichlorobenzene	mg/kg	ND (0.355)	ND (0.354)	60
1,3-Dichlorobenzene	mg/kg	ND (0.355)	ND (0.354)	61
1,4-Dichlorobenzene	mg/kg	ND (0.355)	ND (0.354)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.888)	ND (0.885)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.355)	ND (0.354)	11
2,4-Dichlorophenol	mg/kg	ND (0.355)	ND (0.354)	2
2,4-Dimethylphenol	mg/kg	ND (0.355)	ND (0.354)	73
2,4-Dinitrophenol	mg/kg	ND (0.888)	ND (0.885)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.355)	ND (0.354)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.355)	ND (0.354)	3.7
2-Chloronaphthalene	mg/kg	ND (0.355)	ND (0.354)	6,200
2-Chlorophenol	mg/kg	ND (0.355)	ND (0.354)	4.4
2-Methylnaphthalene	mg/kg	ND (0.355)	ND (0.354)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.355)	ND (0.354)	180
2-Nitroaniline	mg/kg	ND (0.888)	ND (0.885)	11
2-Nitrophenol	mg/kg	ND (0.355)	ND (0.354)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.710)	ND (0.708)	18[7]
3,3'-Dichlorobenzidine	mg/kg	ND (0.355)	ND (0.354)	8.3
3-Nitroaniline	mg/kg	ND (0.888)	ND (0.885)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.888)	ND (0.885)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.355)	ND (0.354)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.355)	ND (0.354)	37
4-Chloroaniline	mg/kg	ND (0.355)	ND (0.354)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.355)	ND (0.354)	NS
4-Nitroaniline	mg/kg	ND (0.888)	ND (0.885)	3.3
4-Nitrophenol	mg/kg	ND (0.888)	ND (0.885)	6
Acenaphthene	mg/kg	ND (0.355)	ND (0.354)	2,700
Acenaphthylene	mg/kg	ND (0.355)	ND (0.354)	2,500
Anthracene	mg/kg	ND (0.355)	ND (0.354)	350
Benzo(a)anthracene	mg/kg	ND (0.355)	ND (0.354)	5.7
Benzo(a)pyrene	mg/kg	ND (0.355)	ND (0.354)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.355)	ND (0.354)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.355)	ND (0.354)	180
Benzo(k)fluoranthene	mg/kg	ND (0.355)	ND (0.354)	57
Benzyl alcohol	mg/kg	ND (0.355)	ND (0.354)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.355)	ND (0.354)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.355)	ND (0.354)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.355)	ND (0.354)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.355)	ND (0.354)	130
Butylbenzylphthalate	mg/kg	ND (0.355)	ND (0.354)	3,000

Table 4.4-1
Analytical Results for Soil
Costello 1 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	COSTELLO-1-B1 5/25/2010	COSTELLO-1-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOC Analyses (8270)				
Chrysene	mg/kg	ND (0.355)	ND (0.354)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.355)	ND (0.354)	0.57
Dibenzofuran	mg/kg	ND (0.355)	ND (0.354)	95
Diethylphthalate	mg/kg	ND (0.355)	ND (0.354)	2,900
Dimethylphthalate	mg/kg	ND (0.355)	ND (0.354)	NS
Di-n-butylphthalate	mg/kg	ND (0.355)	ND (0.354)	1,500
Di-n-octylphthalate	mg/kg	ND (0.355)	ND (0.354)	8,800
Fluoranthene	mg/kg	ND (0.355)	ND (0.354)	3,200
Fluorene	mg/kg	ND (0.355)	ND (0.354)	3,000
Hexachloro-1,3-butadiene	mg/kg	ND (0.355)	ND (0.354)	10
Hexachlorobenzene	mg/kg	ND (0.355)	ND (0.354)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.355)	ND (0.354)	91
Hexachloroethane	mg/kg	ND (0.355)	ND (0.354)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.355)	ND (0.354)	5.7
Isophorone	mg/kg	ND (0.355)	ND (0.354)	10
Naphthalene	mg/kg	ND (0.355)	ND (0.354)	25
Nitrobenzene	mg/kg	ND (0.355)	ND (0.354)	7.3
N-Nitroso-di-n-propylamine	mg/kg	ND (0.355)	ND (0.354)	0.0094
N-Nitrosodiphenylamine	mg/kg	ND (0.355)	ND (0.354)	20
Pentachlorophenol	mg/kg	ND (0.888)	ND (0.886)	5
Phenanthrene	mg/kg	ND (0.355)	ND (0.354)	10,000
Phenol	mg/kg	ND (0.355)	ND (0.354)	200
Pyrene	mg/kg	ND (0.355)	ND (0.354)	2,200

Notes:

[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250 Administration of the Land Recycling Act (Act 2) regulations.

[2]= ND (3.0) = Parameter not detected at the detection limit specified in parentheses.

[3]=No Standard

[4]=as Chromium III.

[5]=as cis-1, 2 - Dichloroethlene

[6]=as Total xylenes.

[7]=as p-Cresol

12.5 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.4-2
Analytical Results for Surface Water
Costello 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		COSTELLO #1 A	COSTELLO #1 B	COSTELLO #1 C	Surface Water Quality Criteria[1]		
Sample Location		*Upgradient*	*Pond*	*Downgradient*	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Sample Date		12/10/2009	12/10/2009	12/10/2009			
Parameter	Units						
General Chemistry							
Acidity, Total (SM 2310B)	mg/L	ND (10.0)[2]	ND (10.0)	ND (10.0)	NS[3]	NS	NS
Alkalinity, Total as CaCO3 (SM 2320B)	mg/L	26	40	24	NS	NS	NS
Nitrogen, Ammonia (EPA 350.1)	mg/L	ND (0.10)	ND (0.10)	ND (0.10)	NS	NS	NS
Chloride (SM 4500-Cl-E)	mg/L	71.2	3.3	56.9	NS	NS	250
Surfactants (SM 5540C)	mg/L	ND (0.10)	ND (0.10)	ND (0.10)	NS	NS	NS
pH (SM 4500-H+B)	Std. Units	7.4	6.8	7.4	6.0-9.0		NS
Total Dissolved Solids (SM 2540C)	mg/L	171	28	154	NS	NS	750
Diesel Components (EPA 8015B Mod)	mg/L	ND (0.11)	ND (0.11)	ND (0.11)	NS	NS	NS
TPH (C06-C10) (EPA 8015B Mod)	ug/L	ND (200)	ND (200)	ND (200)	NS	NS	NS
Total Petroleum Hydrocarbons (EPA 1664A)	mg/L	ND (4.8)	ND (4.8)	ND (5.0)	NS	NS	NS
Total Metals Analyses (6010B/7471)							
Aluminum	ug/L	125	4,710	73	NS	750	NS
Antimony	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	220	1,100	5.6
Arsenic	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	150	340	10
Barium	ug/L	41.8	57.3	39.3	4,100	21,000	2,400
Beryllium	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Boron	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	1,600	8,100	3,100
Cadmium	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Calcium	ug/L	17,600	4,660	16,900	NS	NS	NS
Chromium	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Cobalt	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	19	95	NS
Copper	ug/L	ND (5.0)	19.4	ND (5.0)	NS	NS	NS
Iron	ug/L	192	5,860	114	1,500[3]	1,500[4]	NS[4]
Lead	ug/L	ND (2.0)	13.1	ND (2.0)	NS	NS	NS
Magnesium	ug/L	3,830	2,140	3,630	NS	NS	NS
Manganese	ug/L	17.8	429	6.2	NS	NS	1,000
Molybdenum	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Potassium	ug/L	2,730	3,060	2,350	NS	NS	NS
Selenium	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Silver	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Sodium	ug/L	32,300	1,570	25,700	NS	NS	NS
Thallium	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	13	65	0.24
Vanadium	ug/L	ND (5.0)	7.4	ND (5.0)	100	510	NS
Zinc	ug/L	ND (10.0)	43.4	ND (10.0)	NS	NS	NS
Mercury	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	NS	NS	NS
Dissolved Metals Analyses (6010/7471)							
Aluminum, Dissolved	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	NS	NS	NS
Antimony, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Arsenic, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Barium, Dissolved	ug/L	43.4	ND (10.0)	39.8	NS	NS	NS
Beryllium, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Dissolved	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	NS	NS	NS
Cadmium, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	0.25	2.01	NS
Calcium, Dissolved	ug/L	17,600	3,120	16,500	NS	NS	NS
Chromium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	74.1	569.8	NS
Cobalt, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Copper, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	9.0	13	NS
Iron, Dissolved	ug/L	64.8	131	ND (50.0)	NS	NS	300
Lead, Dissolved	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	2.5	64.6	NS
Magnesium, Dissolved	ug/L	3,810	803	3,520	NS	NS	NS
Manganese, Dissolved	ug/L	12.2	ND (5.0)	8	NS	NS	NS
Molybdenum, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	52	470	610
Potassium, Dissolved	ug/L	2,700	2,060	2,270	NS	NS	NS
Selenium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	4.6	NS	NS
Silver, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	3.2	NS
Sodium, Dissolved	ug/L	32,000	1,550	25,100	NS	NS	NS
Thallium, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Vanadium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Zinc, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	120	120	NS
Mercury, Dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	0.77	1.4	0.05

Table 4.4-2
Analytical Results for Surface Water
Costello 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		COSTELLO #1 A	COSTELLO #1 B	COSTELLO #1 C	Surface Water Quality Criteria[1]		
Sample Location		*Upgradient*	*Pond*	*Downgradient*	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Sample Date		12/10/2009	12/10/2009	12/10/2009			
Parameter	Units						
VOCs Analyses (8260)							
1,1,1-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	610	3,000	NS
1,1,2,2-Tetrachloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	210	1,000	0.17
1,1,2-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	680	3,400	0.59
1,1-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,1-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	1,500	7,500	33
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	26	130	35
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	160	820	420
1,2-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	3,100	15,000	0.38
1,2-Dichloroethene (Total)	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichloropropane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	2,200	11,000	NS
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	150	730	420
2-Butanone (MEK)	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	32,000	230,000	21,000
2-Hexanone	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	4,300	21,000	NS
4-Methyl-2-pentanone (MIBK)	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	5,000	26,000	NS
Acetone	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	86,000	450,000	3,500
Benzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	130	640	1.2
Bromochloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Bromodichloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.55
Bromoform	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	370	1,800	4.3
Bromomethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	110	550	47
Carbon disulfide	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon tetrachloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	560	2,800	0.23
Chlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	240	1,200	130
Chloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Chloroform	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	390	1,900	5.7
Chloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	5,500	28,000	NS
cis-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
cis-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	61	310	0.34
Dibromochloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.4
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	580	2,900	530
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
m&p-Xylene	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	210[5]	1,100[5]	70,000[5]
Methylene Chloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	2,400	12,000	4.6
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	43	140	NS
n-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
n-Propylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
o-Xylene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	210[5]	1,100[5]	70,000[5]
p-Isopropyltoluene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
sec-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Styrene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Tetrachloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	140	700	0.69
Toluene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	330	1,700	1,300
trans-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	1,400	6,800	140
trans-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	61	310	0.34
Trichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	450	2,300	2.5
Vinyl chloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.025
Xylene (Total)	ug/L	ND (3.0)	ND (3.0)	ND (3.0)	210	1,100	700,00

Table 4.4-2
Analytical Results for Surface Water
Costello 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		COSTELLO #1 A	COSTELLO #1 B	COSTELLO #1 C	Surface Water Quality Criteria[1]		
Sample Location		*Upgradient*	*Pond*	*Downgradient*	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Sample Date		12/10/2009	12/10/2009	12/10/2009			
Parameter	Units						
SVOCs Analyses (8270)							
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	26	130	35
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	150	730	420
1-Methylnaphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
2,4,5-Trichlorophenol	ug/L	ND (2.6)	ND (2.6)	ND (2.9)	NS	NS	NS
2,4,6-Trichlorophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	91	460	1.4
2,4-Dichlorophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	340	1,700	77
2,4-Dimethylphenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	130	660	380
2,4-Dinitrophenol	ug/L	ND (2.6)	ND (2.6)	ND (2.9)	320	1,600	0.05
2,4-Dinitrotoluene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	130	660	69
2,6-Dinitrotoluene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	200	990	0.05
2-Chloronaphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	1,000
2-Chlorophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
2-Methylnaphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
2-Methylphenol(o-Cresol)	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
2-Nitroaniline	ug/L	ND (2.6)	ND (2.6)	ND (2.9)	NS	NS	NS
2-Nitrophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	1,600	8,000	NS
3&4-Methylphenol(m&p Cresol)	ug/L	ND (2.1)	ND (2.1)	ND (2.4)	NS	NS	NS
3,3'-Dichlorobenzidine	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
3-Nitroaniline	ug/L	ND (2.6)	ND (2.6)	ND (2.9)	NS	NS	NS
4,6-Dinitro-2-methylphenol	ug/L	ND (2.6)	ND (2.6)	ND (2.9)	16	80	13
4-Bromophenylphenyl ether	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	54	270	NS
4-Chloro-3-methylphenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
4-Chloroaniline	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
4-Chlorophenylphenyl ether	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
4-Nitroaniline	ug/L	ND (2.6)	ND (2.6)	ND (2.9)	NS	NS	NS
4-Nitrophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	470	2,300	NS
Acenaphthene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	17	83	670
Acenaphthylene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
Anthracene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	8,300
Azobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
Benzo(a)anthracene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.0038
Benzoic acid	ug/L	ND (10.4)	ND (10.6)	ND (11.3)	NS	NS	NS
Benzyl alcohol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
bis(2-Chloroethoxy)methane	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
bis(2-Chloroethyl) ether	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	6,000	30,000	0.03
bis(2-Chloroisopropyl) ether	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	1,400
bis(2-Ethylhexyl)phthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	910	4,500	1.2
Butylbenzylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	35	140	150
Carbazole	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
Chrysene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.0038
Dibenzofuran	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
Diethylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	800	4,000	17,000
Dimethylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
Di-n-butylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	21	110	2,000
Di-n-octylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	NS
Fluoranthene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	40	200	130
Fluorene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	1,100

Table 4.4-2
Analytical Results for Surface Water
Costello 1 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		COSTELLO #1 A	COSTELLO #1 B	COSTELLO #1 C	Surface Water Quality Criteria[1]		
Sample Location		*Upgradient*	*Pond*	*Downgradient*	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Sample Date		12/10/2009	12/10/2009	12/10/2009			
Parameter	Units						
SVOCs Analyses (8270) Continued							
Hexachloro-1,3-butadiene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	2	10	0.44
Hexachlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.00028
Hexachlorocyclopentadiene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	1	5	40
Hexachloroethane	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	12	60	1.4
Indeno(1,2,3-cd)pyrene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.0038
Isophorone	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	2,100	10,000	35
Naphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	43	140	NS
Nitrobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	810	4,000	17
N-Nitrosodimethylamine	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	3,400	17,000	0.00069
N-Nitroso-di-n-propylamine	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	0.005
N-Nitrosodiphenylamine	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	59	3,000	3.3
Pentachlorophenol	ug/L	ND (2.5)	ND (2.8)	ND (2.9)	0.00589	0.00768	0.27
Phenanthrene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	1	5	NS
Phenol	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	21,000
Pyrene	ug/L	ND (1.0)	ND (1.1)	ND (1.2)	NS	NS	830

Notes:

[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable. Values provided for chromium are for chromium III. Values for chloride, TDS, pH, manganese and Iron from 25 Pa Code Chapter 93.7, Table 3.

[2]= ND (1.0) = Parameter not detected at the detection limit specified in parentheses.

[3]= No Standard.

[4]= The specific water quality criteria for total recoverable iron is for aquatic life uses and is expressed as a 30-day average concentration. The water quality criteria for human health is expressed as dissolved iron. See 25 PA Code Section 93.7.

[5]= As total xylenes.

[5]= As total xylenes.

5.8 = Results exceed applicable surface water quality criteria

Table 4.5-1
Analytical Results for Soil
(Borehole Locations)
Ely 1H/5H/7H SE Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-5-B1 5/25/2010	ELY-5-B2 5/25/2010	ELY-5-B3 5/25/2010	ELY-5-B4 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses						
Percent Moisture (ASTM D2974-87)	%	6.7	18.9	10.9	7.2	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	13.6	92.4	45.8	13.1	1,900
Chloride (SM 4500-Cl-E)	mg/L	ND (0.5)[2]	ND (3.5)	4.4	ND (3.6)	NS
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.13)	ND (0.13)	0.11	ND (0.13)	NS
Ethylene Glycol (EPA 8015)	mg/kg	ND (12.5)	ND (12.5)	ND (12.5)	ND (12.5)	1,400
Metals Analyses (6010B/7471)						
Aluminum	mg/kg	11,500	15,400	12,900	13,100	190,000
Antimony	mg/kg	0.33	ND (0.35)	ND (0.42)	ND (0.34)	27
Arsenic	mg/kg	2.8	2.7	1.7	2.2	12
Barium	mg/kg	62.4	109	76.9	126	8,200
Beryllium	mg/kg	0.53	0.71	0.85	0.81	320
Boron	mg/kg	9.6	11.3	10.8	11.2	1,900
Cadmium	mg/kg	0.56	0.7	0.34	0.41	38
Calcium	mg/kg	441	459	731	1,160	NS
Chromium	mg/kg	18.1	19	19.8	20.4	190,000[4]
Cobalt	mg/kg	12	9.7	12.2	13.3	50
Copper	mg/kg	2.6	4.4	2.7	8.1	8,100
Iron	mg/kg	32,800	35,100	36,000	38,300	150,000
Lead	mg/kg	2.9	6.8	2.8	3.3	450
Magnesium	mg/kg	4,550	3,120	4,900	5,320	NS
Manganese	mg/kg	322	707	232	372	2,000
Molybdenum	mg/kg	ND (1.3)	ND (1.4)	ND (1.5)	ND (1.3)	650
Nickel	mg/kg	30.1	20.6	34.2	34.6	650
Potassium	mg/kg	1,790	1,810	2,100	2,090	NS
Selenium	mg/kg	0.42	0.43	ND (0.42)	ND (0.34)	26
Silver	mg/kg	1.2	1.5	0.44	0.45	84
Sodium	mg/kg	ND (104)	ND (264)	ND (428)	ND (337)	NS
Thallium	mg/kg	ND (1.3)	ND (1.4)	ND (1.5)	ND (1.3)	14
Vanadium	mg/kg	17.1	23.5	18.6	19.4	1,500
Zinc	mg/kg	51.9	63.9	58.9	59.5	12,000
Mercury	mg/kg	ND (0.12)	ND (0.12)	ND (0.11)	ND (0.11)	10
VOC Analyses						
1,1,1-Trichloroethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	60
1,2-Dichloroethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.011)	ND (0.0125)	ND (0.0128)	ND (0.0161)	7[5]
1,2-Dichloropropane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	10
2-Butanone (MEK)	mg/kg	ND (0.011)	0.152	ND (0.0128)	ND (0.0161)	400
2-Hexanone	mg/kg	ND (0.011)	ND (0.0125)	ND (0.0128)	ND (0.0161)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.011)	ND (0.0125)	ND (0.0128)	ND (0.0161)	290
Acetone	mg/kg	0.0458	1.470	0.0431	0.159	3,300
Benzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
Bromodichloromethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	8
Bromoform	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	8
Bromomethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	1
Carbon disulfide	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	150
Carbon tetrachloride	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
Chlorobenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	10
Chloroethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	23
Chloroform	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	8
Chloromethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.66
Dibromochloromethane	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	8
Ethylbenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	600
m&p-Xylene	mg/kg	ND (0.011)	ND (0.0125)	ND (0.0128)	ND (0.0161)	1,000[6]
Methylene Chloride	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	2
Naphthalene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	25
n-Butylbenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	950
n-Propylbenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	290
o-Xylene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	1,000[6]
p-Isopropyltoluene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	NS
sec-Butylbenzene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	350
Styrene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	24
Tetrachloroethene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
Toluene	mg/kg	ND (0.0055)	0.297	ND (0.0064)	ND (0.0080)	100
TOTAL BTEX	mg/kg	ND (0.0333)	0.297	ND (0.0383)	ND (0.0482)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.66
Trichloroethene	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.5
Vinyl chloride	mg/kg	ND (0.0055)	ND (0.0063)	ND (0.0064)	ND (0.0080)	0.2
Xylene (Total)	mg/kg	ND (0.0166)	ND (0.0189)	ND (0.0192)	ND (0.0241)	1,000

Table 4.5-1
Analytical Results for Soil
(Borehole Locations)
Ely 1H/5H/7H SE Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-5-B1 5/25/2010	ELY-5-B2 5/25/2010	ELY-5-B3 5/25/2010	ELY-5-B4 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOC Analyses						
1,2,4-Trichlorobenzene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	27
1,2-Dichlorobenzene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	60
1,3-Dichlorobenzene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	61
1,4-Dichlorobenzene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.867)	ND (1.000)	ND (0.935)	ND (0.895)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	11
2,4-Dichlorophenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	2
2,4-Dimethylphenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	73
2,4-Dinitrophenol	mg/kg	ND (0.867)	ND (1.000)	ND (0.935)	ND (0.895)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	3.7
2-Chloronaphthalene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	6,200
2-Chlorophenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	4.4
2-Methylnaphthalene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	180
2-Nitroaniline	mg/kg	ND (0.867)	ND (1.000)	ND (0.935)	ND (0.895)	11
2-Nitrophenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.693)	1.43	ND (0.747)	ND (0.713)	18[7]
3,3'-Dichlorobenzidine	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	8.3
3-Nitroaniline	mg/kg	ND (0.867)	ND (1.000)	ND (0.935)	ND (0.895)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.867)	ND (1.000)	ND (0.935)	ND (0.895)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	37
4-Chloroaniline	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	NS
4-Nitroaniline	mg/kg	ND (0.867)	ND (1.000)	ND (0.935)	ND (0.895)	3.3
4-Nitrophenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	6
Acenaphthene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	2,700
Acenaphthylene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	2,500
Anthracene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	350
Benzo(a)anthracene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	5.7
Benzo(a)pyrene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	180
Benzo(k)fluoranthene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	57
Benzyl alcohol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	130
Butylbenzylphthalate	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	3,000
Chrysene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.57
Dibenzofuran	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	95
Diethylphthalate	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	2,900
Dimethylphthalate	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	NS
Di-n-butylphthalate	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	1500
Di-n-octylphthalate	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	8,800
Fluoranthene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	3,200
Fluorene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	3,000
Hexachloro-1,3-butadiene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	10
Hexachlorobenzene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	91
Hexachloroethane	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	5.7
Isophorone	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	10
Naphthalene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	25
Nitrobenzene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	7.3
N-Nitroso-di-n-propylamine	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	0.0094
N-Nitrosodiphenylamine	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	20
Pentachlorophenol	mg/kg	ND (0.867)	ND (1.000)	ND (0.935)	ND (0.895)	5
Phenanthrene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	10,000
Phenol	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	200
Pyrene	mg/kg	ND (0.347)	ND (0.402)	ND (0.374)	ND (0.358)	2,200

Notes:

[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250 Administration of the Land Recycling Act (Act 2) regulations.

[2]= ND (3.0) = Parameter not detected at the detection limit specified in parentheses.

[3]=No Standard

[4]=as Chromium III.

[5]=as cis-1, 2 - Dichloroethlene

[6]=as Total xylenes.

[7]=as p-Cresol

Table 4.5-2
Analytical Results for Soil
(Test Pit Locations)
Ely 1H/5H/7H SE Wellsite
Dimock Township
Susquehanna County, PA

Sample Identification Sample Date Parameter	Units	Ely-5-P1A 5/27/2010	Ely-5-P1B 5/27/2010	Ely-5-P2A 5/26/2010	Ely-5-P2B 5/27/2010	Ely-5-P2C 5/27/2010	Ely-5-P3A 5/27/2010	Ely-5-P3B 5/27/2010	Ely-5-P4A 5/27/2010	Ely-5-P4B 5/27/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses											
Percent Moisture (%)	%	7.5	6.0	10.5	7.9	9.3	7.1	8.5	0.52	5.8	NS[3]
VOCs (8260)											
Benzene	mg/kg	ND (0.0075)[2]	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**0.5**
Ethylbenzene	mg/kg	ND (0.0075)	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**70**
Isopropylbenzene (Cumene)	mg/kg	ND (0.0075)	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**600**
Methyl-tert-butyl ether	mg/kg	ND (0.0075)	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**2**
Naphthalene	mg/kg	ND (0.0075)	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**25**
Toluene	mg/kg	ND (0.0075)	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**100**
1,2,4-Trimethylbenzene	mg/kg	ND (0.0075)	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**8.4**
1,3,5-Trimethylbenzene	mg/kg	ND (0.0075)	ND (0.0087)	ND (0.0044)	ND (0.0045)	ND (0.0050)	ND (0.0065)	ND (0.0068)	ND (0.0072)	ND (0.0060)	**2.3**

Notes:
All results in milligram per kilogram (mg/kg) unless otherwise stated.
[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.
[2]= ND (0.0075) = Parameter not detected at the detection limit specified in parentheses.
[3]=No Standard

Table 4.6-1
Analytical Results for Soil
Ely 2 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-2-B1 5/25/2010	ELY-2-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses				
Percent Moisture (ASTM D2974-87)	%	10.1	8.8	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	11.3	5.5	1,900
Chloride (SM 4500-Cl-E)	mg/L	ND (3.0)[2]	ND (3.0)	NS
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.10)	ND (0.12)	NS
Ethylene Glycol (EPA 8015)	mg/kg	ND (10.0)	ND (10.0)	1,400
Metals Analyses (6010B/7471)				
Aluminum	mg/kg	15,500	13,200	190,000
Antimony	mg/kg	ND (0.44)	ND (0.44)	27
Arsenic	mg/kg	19.6	15.4	12
Barium	mg/kg	75.9	71.7	8,200
Beryllium	mg/kg	0.79	0.72	320
Boron	mg/kg	9.1	7.9	1900
Cadmium	mg/kg	0.63	0.43	38
Calcium	mg/kg	1,860	1,490	NS
Chromium	mg/kg	17.6	15.1	190,000[4]
Cobalt	mg/kg	14.2	12	50
Copper	mg/kg	13.8	11.1	8,100
Iron	mg/kg	32,700	26,200	150,000
Lead	mg/kg	28.2	20.9	450
Magnesium	mg/kg	5,720	4,750	NS
Manganese	mg/kg	1,490	1,670	2,000
Molybdenum	mg/kg	ND (1.8)	ND (1.7)	650
Nickel	mg/kg	26.4	23.5	650
Potassium	mg/kg	1,920	1,900	NS
Selenium	mg/kg	0.58	ND (0.44)	26
Silver	mg/kg	0.33	0.26	84
Sodium	mg/kg	ND (442)	ND (435)	NS
Thallium	mg/kg	ND (1.8)	ND (1.7)	14
Vanadium	mg/kg	17.1	14.3	1,500
Zinc	mg/kg	95.1	72	12,000
Mercury	mg/kg	ND (0.11)	ND (0.11)	10
VOC Analyses (8260)				
1,1,1-Trichloroethane	mg/kg	ND (0.0042)	ND (0.0060)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0042)	ND (0.0060)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0042)	ND (0.0060)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0042)	ND (0.0060)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0042)	ND (0.0060)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0042)	ND (0.0060)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0042)	ND (0.0060)	60
1,2-Dichloroethane	mg/kg	ND (0.0042)	ND (0.0060)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0084)	ND (0.0160)	7[5]
1,2-Dichloropropane	mg/kg	ND (0.0042)	ND (0.0060)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0042)	ND (0.0060)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0042)	ND (0.0060)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0042)	ND (0.0060)	10
2-Butanone (MEK)	mg/kg	ND (0.0084)	0.0293	400
2-Hexanone	mg/kg	ND (0.0084)	ND (0.0160)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0084)	ND (0.0160)	290
Acetone	mg/kg	0.0365	ND (0.770)	3,300
Benzene	mg/kg	ND (0.0042)	ND (0.0060)	0.5
Bromodichloromethane	mg/kg	ND (0.0042)	ND (0.0060)	8
Bromoform	mg/kg	ND (0.0042)	ND (0.0060)	8
Bromomethane	mg/kg	ND (0.0042)	ND (0.0060)	1
Carbon disulfide	mg/kg	ND (0.0042)	ND (0.0060)	150
Carbon tetrachloride	mg/kg	ND (0.0042)	ND (0.0060)	0.5
Chlorobenzene	mg/kg	ND (0.0042)	ND (0.0060)	10
Chloroethane	mg/kg	ND (0.0042)	ND (0.0060)	23
Chloroform	mg/kg	ND (0.0042)	ND (0.0060)	8
Chloromethane	mg/kg	ND (0.0042)	ND (0.0060)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0042)	ND (0.0060)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0042)	ND (0.0060)	0.66
Dibromochloromethane	mg/kg	ND (0.0042)	ND (0.0060)	8

Table 4.6-1
Analytical Results for Soil
Ely 2 Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-2-B1 5/25/2010	ELY-2-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
VOC Analyses (8260)				
Ethylbenzene	mg/kg	ND (0.0042)	ND (0.0060)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0042)	ND (0.0060)	600
m&p-Xylene	mg/kg	ND (0.0084)	ND (0.0160)	1,000[e]
Methylene Chloride	mg/kg	ND (0.0042)	ND (0.0060)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0042)	ND (0.0060)	2
Naphthalene	mg/kg	ND (0.0042)	ND (0.0060)	25
n-Butylbenzene	mg/kg	ND (0.0042)	ND (0.0060)	950
n-Propylbenzene	mg/kg	ND (0.0042)	ND (0.0060)	290
o-Xylene	mg/kg	ND (0.0042)	ND (0.0080)	1,000[e]
p-Isopropyltoluene	mg/kg	ND (0.0042)	ND (0.0060)	NS
sec-Butylbenzene	mg/kg	ND (0.0042)	ND (0.0060)	350
Styrene	mg/kg	ND (0.0042)	ND (0.0060)	24
Tetrachloroethene	mg/kg	ND (0.0042)	ND (0.0060)	0.5
Toluene	mg/kg	ND (0.0042)	ND (0.0060)	100
TOTAL BTEX	mg/kg	ND (0.0252)	ND (0.0478)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0042)	ND (0.0060)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0042)	ND (0.0060)	0.66
Trichloroethene	mg/kg	ND (0.0042)	ND (0.0060)	0.5
Vinyl chloride	mg/kg	ND (0.0042)	ND (0.0060)	0.2
Xylene (Total)	mg/kg	ND (0.0126)	ND (0.0240)	1,000
SVOC Analyses (8270)				
1,2,4-Trichlorobenzene	mg/kg	ND (0.361)	ND (0.362)	27
1,2-Dichlorobenzene	mg/kg	ND (0.361)	ND (0.362)	60
1,3-Dichlorobenzene	mg/kg	ND (0.361)	ND (0.362)	61
1,4-Dichlorobenzene	mg/kg	ND (0.361)	ND (0.362)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.904)	ND (0.907)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.361)	ND (0.362)	11
2,4-Dichlorophenol	mg/kg	ND (0.361)	ND (0.362)	2
2,4-Dimethylphenol	mg/kg	ND (0.361)	ND (0.362)	73
2,4-Dinitrophenol	mg/kg	ND (0.904)	ND (0.907)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.361)	ND (0.282)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.361)	ND (0.362)	3.7
2-Chloronaphthalene	mg/kg	ND (0.361)	ND (0.362)	6,200
2-Chlorophenol	mg/kg	ND (0.361)	ND (0.362)	4.4
2-Methylnaphthalene	mg/kg	ND (0.361)	ND (0.362)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.361)	ND (0.362)	180
2-Nitroaniline	mg/kg	ND (0.904)	ND (0.907)	11
2-Nitrophenol	mg/kg	ND (0.361)	ND (0.362)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.723)	ND (0.725)	18[f]
3,3'-Dichlorobenzidine	mg/kg	ND (0.361)	ND (0.362)	8.3
3-Nitroaniline	mg/kg	ND (0.904)	ND (0.907)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.904)	ND (0.907)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.361)	ND (0.362)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.361)	ND (0.362)	37
4-Chloroaniline	mg/kg	ND (0.361)	ND (0.362)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.361)	ND (0.362)	NS
4-Nitroaniline	mg/kg	ND (0.904)	ND (0.907)	3.3
4-Nitrophenol	mg/kg	ND (0.361)	ND (0.362)	6
Acenaphthene	mg/kg	ND (0.361)	ND (0.362)	2,700
Acenaphthylene	mg/kg	ND (0.361)	ND (0.362)	2,500
Anthracene	mg/kg	ND (0.361)	ND (0.362)	350
Benzo(a)anthracene	mg/kg	ND (0.361)	ND (0.362)	5.7
Benzo(a)pyrene	mg/kg	ND (0.361)	ND (0.362)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.361)	ND (0.362)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.361)	ND (0.362)	180
Benzo(k)fluoranthene	mg/kg	ND (0.361)	ND (0.362)	57
Benzyl alcohol	mg/kg	ND (0.361)	ND (0.362)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.361)	ND (0.362)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.361)	ND (0.362)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.361)	ND (0.362)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.361)	ND (0.362)	130
Butylbenzylphthalate	mg/kg	ND (0.361)	ND (0.362)	3,000

Table 4.6-1
Analytical Results for Soil
Ely 2 Wellsite

Dimock Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-2-B1 5/25/2010	ELY-2-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOC Analyses (8270)				
Chrysene	mg/kg	ND (0.361)	ND (0.362)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.361)	ND (0.362)	0.57
Dibenzofuran	mg/kg	ND (0.361)	ND (0.362)	95
Diethylphthalate	mg/kg	ND (0.361)	ND (0.362)	2,900
Dimethylphthalate	mg/kg	ND (0.361)	ND (0.362)	NS
Di-n-butylphthalate	mg/kg	ND (0.361)	ND (0.362)	1500
Di-n-octylphthalate	mg/kg	ND (0.361)	ND (0.362)	8,800
Fluoranthene	mg/kg	ND (0.361)	ND (0.362)	3,200
Fluorene	mg/kg	ND (0.361)	ND (0.362)	3,000
Hexachloro-1,3-butadiene	mg/kg	ND (0.361)	ND (0.362)	10
Hexachlorobenzene	mg/kg	ND (0.361)	ND (0.362)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.361)	ND (0.362)	91
Hexachloroethane	mg/kg	ND (0.361)	ND (0.362)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.361)	ND (0.362)	5.7
Isophorone	mg/kg	ND (0.361)	ND (0.362)	10
Naphthalene	mg/kg	ND (0.361)	ND (0.362)	25
Nitrobenzene	mg/kg	ND (0.361)	ND (0.362)	7.3
N-Nitroso-di-n-propylamine	mg/kg	ND (0.361)	ND (0.362)	0.0094
N-Nitrosodiphenylamine	mg/kg	ND (0.361)	ND (0.362)	20
Pentachlorophenol	mg/kg	ND (0.904)	ND (0.907)	5
Phenanthrene	mg/kg	ND (0.361)	ND (0.362)	10,000
Phenol	mg/kg	ND (0.361)	ND (0.362)	200
Pyrene	mg/kg	ND (0.361)	ND (0.362)	2,200

Notes:
[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250 Administration of the Land Recycling Act (Act 2) regulations.
[2]= ND (3.0) = Parameter not detected at the detection limit specified in parentheses.
[3]=No Standard
[4]=as Chromium III.
[5]=as cis-1, 2 - Dichloroethlene
[6]=as Total xylenes.
[7]=as p-Cresol
19.6 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.6-2
Analytical Results for Surface Water
Ely 2 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification *Sample Location* Sample Date Parameter	Units	ELY #2 A *Upgradient* 12/8/2009	ELY #2 B *Downgradient* 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
General Chemistry						
Acidity, Total (SM 2310B)	mg/L	ND (10.0)[2]	ND (10.0)	NS[3]	NS	NS
Alkalinity, Total as CaCO3 (SM 2320B)	mg/L	ND (10.0)	12.5	NS	NS	NS
Nitrogen, Ammonia (EPA 350.1)	mg/L	ND (0.10)	ND (0.10)	NS	NS	NS
Chloride (SM 4500-Cl-E)	mg/L	66	28.7	NS	NS	250
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.10)	ND (0.10)	NS	NS	NS
pH (SM 4500-H+B)	Std. Units	6.4	6.6	6.0-9.0		NS
Total Dissolved Solids (SM 2540C)	mg/L	230	97	NS	NS	750
Diesel Components (DRO, EPA 8015B Mod)	mg/L	ND (0.13)	ND (0.13)	NS	NS	NS
TPH (C06-C10) (GRO, EPA 8015B Mod)	ug/L	ND (200)	ND (200)	NS	NS	NS
Total Petroleum Hydrocarbons (EPA 1664A)	mg/L	ND (4.8)	ND (4.9)	NS	NS	NS
Total Metals Analyses (6010B/7471)						
Aluminum	ug/L	107	3,110	NS	750	NS
Antimony	ug/L	ND (5.0)	ND (5.0)	220	1,100	5.6
Arsenic	ug/L	ND (5.0)	ND (5.0)	150	340	10
Barium	ug/L	57	92.9	4,100	21,000	2,400
Beryllium	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron	ug/L	ND (50.0)	ND (50.0)	1,600	8,100	3,100
Cadmium	ug/L	ND (1.0)	1.0	NS	NS	NS
Calcium	ug/L	23,800	16,400	NS	NS	NS
Chromium	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Cobalt	ug/L	ND (5.0)	ND (5.0)	19	95	NS
Copper	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Iron	ug/L	ND (50.0)	3,120	1,500[4]	1,500[4]	NS[4]
Lead	ug/L	ND (2.0)	9.7	NS	NS	NS
Magnesium	ug/L	4,110	3,350	NS	NS	NS
Manganese	ug/L	ND (5.0)	481	NS	NS	1,000
Molybdenum	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Potassium	ug/L	933	1,280	NS	NS	NS
Selenium	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Silver	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Sodium	ug/L	9,290	4,710	NS	NS	NS
Thallium	ug/L	ND (10.0)	ND (10.0)	13	65	0.24
Vanadium	ug/L	ND (5.0)	ND (5.0)	100	510	NS
Zinc	ug/L	ND (10.0)	29.3	NS	NS	NS
Mercury	ug/L	ND (0.20)	ND (0.20)	NS	NS	NS
Dissolved Metals Analyses (6010/7471)						
Aluminum, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Antimony, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Arsenic, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Barium, Dissolved	ug/L	63.1	45.2	NS	NS	NS
Beryllium, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	NS
Cadmium, Dissolved	ug/L	ND (1.0)	ND (1.0)	0.25	2.01	NS
Calcium, Dissolved	ug/L	24,500	14,500	NS	NS	NS
Chromium, Dissolved	ug/L	ND (5.0)	ND (5.0)	74.1	569.8	NS
Cobalt, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Copper, Dissolved	ug/L	ND (5.0)	ND (5.0)	9.0	13	NS
Iron, Dissolved	ug/L	ND (50.0)	ND (50.0)	NS	NS	300
Lead, Dissolved	ug/L	ND (2.0)	ND (2.0)	2.5	64.6	NS
Magnesium, Dissolved	ug/L	4,620	2,830	NS	NS	NS
Manganese, Dissolved	ug/L	8.8	14.1	NS	NS	NS
Molybdenum, Dissolved	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel, Dissolved	ug/L	ND (10.0)	ND (10.0)	52	470	610
Potassium, Dissolved	ug/L	1,010	818	NS	NS	NS
Selenium, Dissolved	ug/L	ND (5.0)	ND (5.0)	4.6	NS	NS
Silver, Dissolved	ug/L	ND (1.0)	ND (1.0)	NS	3.2	NS
Sodium, Dissolved	ug/L	10,900	5,360	NS	NS	NS
Thallium, Dissolved	ug/L	ND (10.0)	ND (10.0)	NS	NS	NS
Vanadium, Dissolved	ug/L	ND (5.0)	ND (5.0)	NS	NS	NS
Zinc, Dissolved	ug/L	ND (10.0)	ND (10.0)	120	120	NS
Mercury, Dissolved	ug/L	ND (0.20)	ND (0.20)	0.77	1.4	0.05

Table 4.6-2
Analytical Results for Surface Water
Ely 2 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification / *Sample Location* / Sample Date / Parameter	Units	ELY #2 A *Upgradient* 12/8/2009	ELY #2 B *Downgradient* 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
VOCs Analyses (8260)						
1,1,1-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	610	3,000	NS
1,1,2,2-Tetrachloroethane	ug/L	ND (1.0)	ND (1.0)	210	1,000	0.17
1,1,2-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	680	3,400	0.59
1,1-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,1-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,500	7,500	33
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.0)	26	130	35
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	160	820	420
1,2-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	3,100	15,000	0.38
1,2-Dichloroethene (Total)	ug/L	ND (2.0)	ND (2.0)	NS	NS	NS
1,2-Dichloropropane	ug/L	ND (1.0)	ND (1.0)	2,200	11,000	NS
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	150	730	420
2-Butanone (MEK)	ug/L	ND (10.0)	ND (10.0)	32,000	230,000	21,000
2-Hexanone	ug/L	ND (10.0)	ND (10.0)	4,300	21,000	NS
4-Methyl-2-pentanone (MIBK)	ug/L	ND (10.0)	ND (10.0)	5,000	26,000	NS
Acetone	ug/L	ND (10.0)	ND (10.0)	86,000	450,000	3,500
Benzene	ug/L	ND (1.0)	ND (1.0)	130	640	1.2
Bromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Bromodichloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.55
Bromoform	ug/L	ND (1.0)	ND (1.0)	370	1,800	4.3
Bromomethane	ug/L	ND (1.0)	ND (1.0)	110	550	47
Carbon disulfide	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon tetrachloride	ug/L	ND (1.0)	ND (1.0)	560	2,800	0.23
Chlorobenzene	ug/L	ND (1.0)	ND (1.0)	240	1,200	130
Chloroethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Chloroform	ug/L	ND (1.0)	ND (1.0)	390	1,900	5.7
Chloromethane	ug/L	ND (1.0)	ND (1.0)	5,500	28,000	NS
cis-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
cis-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
Dibromochloromethane	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.4
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	580	2,900	530
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
m&p-Xylene	ug/L	ND (2.0)	ND (2.0)	210[5]	1,100[5]	70,000[5]
Methylene Chloride	ug/L	ND (1.0)	ND (1.0)	2,400	12,000	4.6
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (2.0)	ND (2.0)	43	140	NS
n-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
n-Propylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
o-Xylene	ug/L	ND (1.0)	ND (1.0)	210[5]	1,100[5]	70,000[5]
p-Isopropyltoluene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
sec-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Styrene	ug/L	ND (1.0)	ND (1.0)	NS	NS	NS
Tetrachloroethene	ug/L	ND (1.0)	ND (1.0)	140	700	0.69
Toluene	ug/L	ND (1.0)	ND (1.0)	330	1,700	1,300
trans-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	1,400	6,800	140
trans-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	61	310	0.34
Trichloroethene	ug/L	ND (1.0)	ND (1.0)	450	2,300	2.5
Vinyl chloride	ug/L	ND (1.0)	ND (1.0)	NS	NS	0.025
Xylene (Total)	ug/L	ND (3.0)	ND (3.0)	210	1,100	70,000

Table 4.6-2
Analytical Results for Surface Water
Ely 2 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification / Sample Location / Sample Date / Parameter	Units	ELY #2 A *Upgradient* 12/8/2009	ELY #2 B *Downgradient* 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs Analyses (8270)						
1,2,4-Trichlorobenzene	ug/L	ND (1.1)	ND (1.1)	26	130	35
1,2-Dichlorobenzene	ug/L	ND (1.1)	ND (1.1)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.1)	ND (1.1)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.1)	ND (1.1)	150	730	420
1-Methylnaphthalene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
2,4,5-Trichlorophenol	ug/L	ND (2.8)	ND (2.8)	NS	NS	NS
2,4,6-Trichlorophenol	ug/L	ND (1.1)	ND (1.1)	91	460	1.4
2,4-Dichlorophenol	ug/L	ND (1.1)	ND (1.1)	340	1700	77
2,4-Dimethylphenol	ug/L	ND (1.1)	ND (1.1)	130	660	380
2,4-Dinitrophenol	ug/L	ND (2.8)	ND (2.8)	320	1600	0.05
2,4-Dinitrotoluene	ug/L	ND (1.1)	ND (1.1)	130	660	69
2,6-Dinitrotoluene	ug/L	ND (1.1)	ND (1.1)	200	990	0.05
2-Chloronaphthalene	ug/L	ND (1.1)	ND (1.1)	NS	NS	1000
2-Chlorophenol	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
2-Methylnaphthalene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
2-Methylphenol(o-Cresol)	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
2-Nitroaniline	ug/L	ND (2.8)	ND (2.8)	NS	NS	NS
2-Nitrophenol	ug/L	ND (1.1)	ND (1.1)	1600	8000	NS
3&4-Methylphenol(m&p Cresol)	ug/L	ND (2.1)	ND (2.1)	NS	NS	NS
3,3'-Dichlorobenzidine	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
3-Nitroaniline	ug/L	ND (2.8)	ND (2.8)	NS	NS	NS
4,6-Dinitro-2-methylphenol	ug/L	ND (2.8)	ND (2.8)	16	80	13
4-Bromophenylphenyl ether	ug/L	ND (1.1)	ND (1.1)	54	270	NS
4-Chloro-3-methylphenol	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chloroaniline	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chlorophenylphenyl ether	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
4-Nitroaniline	ug/L	ND (2.8)	ND (2.8)	NS	NS	NS
4-Nitrophenol	ug/L	ND (1.1)	ND (1.1)	470	2300	NS
Acenaphthene	ug/L	ND (1.1)	ND (1.1)	17	83	670
Acenaphthylene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Anthracene	ug/L	ND (1.1)	ND (1.1)	NS	NS	8300
Azobenzene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(a)anthracene	ug/L	ND (1.1)	ND (1.1)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzoic acid	ug/L	ND (10.5)	ND (10.8)	NS	NS	NS
Benzyl alcohol	ug/L	ND (2.1)	ND (2.1)	NS	NS	NS
bis(2-Chloroethoxy)methane	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
bis(2-Chloroethyl) ether	ug/L	ND (1.1)	ND (1.1)	6000	30000	0.03
bis(2-Chloroisopropyl) ether	ug/L	ND (1.1)	ND (1.1)	NS	NS	1400
bis(2-Ethylhexyl)phthalate	ug/L	ND (1.1)	ND (1.1)	910	4500	1.2
Butylbenzylphthalate	ug/L	ND (1.1)	ND (1.1)	35	140	150
Carbazole	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Chrysene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenzofuran	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Diethylphthalate	ug/L	ND (1.1)	ND (1.1)	800	4000	17000
Dimethylphthalate	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Di-n-butylphthalate	ug/L	ND (1.1)	ND (1.1)	21	110	2000
Di-n-octylphthalate	ug/L	ND (1.1)	ND (1.1)	NS	NS	NS
Fluoranthene	ug/L	ND (1.1)	ND (1.1)	40	200	130
Fluorene	ug/L	ND (1.1)	ND (1.1)	NS	NS	1100

Table 4.6-2
Analytical Results for Surface Water
Ely 2 Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification / Sample Location / Sample Date / Parameter	Units	ELY #2 A *Upgradient* 12/8/2009	ELY #2 B *Downgradient* 12/8/2009	Surface Water Quality Criteria[1]		
				Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs Analyses (8270) Continued						
Hexachloro-1,3-butadiene	ug/L	ND (1.1)	ND (1.1)	2	10	0.44
Hexachlorobenzene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.00028
Hexachlorocyclopentadiene	ug/L	ND (1.1)	ND (1.1)	1	5	40
Hexachloroethane	ug/L	ND (1.1)	ND (1.1)	12	60	1.4
Indeno(1,2,3-cd)pyrene	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.0038
Isophorone	ug/L	ND (1.1)	ND (1.1)	2100	10000	35
Naphthalene	ug/L	ND (1.1)	ND (1.1)	43	140	NS
Nitrobenzene	ug/L	ND (1.1)	ND (1.1)	810	4000	17
N-Nitrosodimethylamine	ug/L	ND (1.1)	ND (1.1)	3400	17000	0.00069
N-Nitroso-di-n-propylamine	ug/L	ND (1.1)	ND (1.1)	NS	NS	0.005
N-Nitrosodiphenylamine	ug/L	ND (1.1)	ND (1.1)	59	3000	3.3
Pentachlorophenol	ug/L	ND (2.5)	ND (2.5)	0.00589	0.00768	0.27
Phenanthrene	ug/L	ND (1.1)	ND (1.1)	1	5	NS
Phenol	ug/L	ND (1.1)	ND (1.1)	NS	NS	21000
Pyrene	ug/L	ND (1.1)	ND (1.1)	NS	NS	830

Notes:

[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable. Values provided for chromium are for chromium III. Values for chloride, TDS, pH, manganese and Iron from 25 Pa Code Chapter 93.7, Table 3.

[2]= ND (1 0) = Parameter not detected at the detection limit specified in parentheses.

[3]= No Standard.

[4]= The specific water quality criteria for total recoverable Iron is for aquatic life uses and is expressed as a 30-day average concentration. The water quality criteria for human health is expressed as dissolved iron. See 25 PA Code Section 93.7.

[5]= As total xylenes.

[5]= As total xylenes.

5.8 = Results exceed SHS surface water quality criteria.

Table 4.7-1
Analytical Results for Soil
Ely 4/6H Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-4-P1A 5/25/2010	ELY-4-P1B 5/25/2010	ELY-4-P2A 5/25/2010	ELY-4-P2B 5/25/2010	ELY-4-P3A 5/25/2010	ELY-4-P3B 5/25/2010	ELY-4-P3C 5/25/2010	ELY-4-P4A 5/25/2010	ELY-4-P4B 5/25/2010	ELY-4-P5A 5/25/2010	ELY-4-P5B 5/25/2010	ELY-4-P6A 5/25/2010	ELY-4-P6B 5/25/2010	ELY-4-P7A 5/25/2010	ELY-4-P7B 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses																	
Percent Moisture (ASTM D2974-87)	%	10.6	17.6	8.6	10.2	10.9	9.3	8.8	17.6	15.1	14.8	13	11.2	22.4	29.4	21.4	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	45.2	76.8	13.3	17.4	33.6	7.8	212	337	39.3	88.5	19.9	160	10.8	183	20.9	1,900
pH (EPA 9045)	Std. Units	6.7	4.9	5	5.7	5.2	5.3	6.4	6.3	5.1	6.3	5.7	6	5.5	5.3	6.3	NS
Chloride (SM 4500-Cl-E)	mg/L	5.5	35.8	5.5	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	3.8	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	NS
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.10)[2]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	NS
Diesel Components (DRO, EPA 8015B Mod)	mg/kg	232	41.1	ND (7.1)	58.6	12.6	ND (7.2)	ND (7.2)	23.7	ND (7.8)	ND (7.6)	ND (7.6)	ND (7.3)	ND (9.5)	ND (8.3)	ND (8.4)	NS
TPH (C06-C10) (GRO, EPA 8015B Mod)	mg/kg	ND (11.1)	ND (12.8)	ND (8.7)	ND (10.0)	ND (11.4)	ND (9.8)	ND (8.5)	ND (11.8)	ND (8.6	ND (12.8)	ND (12.7)	ND (10.1)	ND (14.1)	ND (16.4)	ND (13.8)	NS
Ethylene Glycol (EPA 8015)	mg/kg	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (15.0)	ND (10.0)	ND (10.0)	1,400
Metals Analyses (6010B/7471)																	
Aluminum	mg/kg	14,100	16,900	12,700	14,000	16,500	14,500	15,400	14,100	13,300	14,700	14,900	12,900	13,900	18,200	18,100	190,000
Antimony	mg/kg	ND (0.30)	ND (0.43)	ND (0.34)	ND (0.44)	ND (0.40)	0.86	ND (0.46)	ND (0.51)	ND (0.35)	ND (0.44)	ND (0.42)	ND (0.45)	ND (0.49)	ND (0.82)	ND (0.45)	27
Arsenic	mg/kg	29	19.3	20.7	26.3	5	3.8	3.3	17.9	12.1	2.7	3.4	35.9	8.2	22.8	32.6	12
Barium	mg/kg	3,900	1,340	111	115	93.4	84.4	90.3	108	61.1	113	65.9	127	111	380	317	8,200
Beryllium	mg/kg	0.71	0.6	0.83	0.84	0.81	1.1	1.3	0.59	0.62	0.54	0.66	0.85	0.41	1.5	1.8	320
Boron	mg/kg	7.5	8.9	9	9.6	10.3	12.7	12.5	8	7.3	8.4	8.6	9.9	8.2	10.6	10.6	1,900
Cadmium	mg/kg	0.75	0.46	0.85	0.9	0.62	0.49	0.53	0.71	0.45	0.4	0.36	1.2	0.46	1.1	1	38
Calcium	mg/kg	945	533	940	1,490	184	626	661	623	260	1,070	415	1,170	644	1,870	1,620	NS
Chromium	mg/kg	14.7	16.8	14.4	15.1	17.7	18.9	20.3	13.7	14	16	18.5	14.5	13.6	20.3	21.8	190,000[4]
Cobalt	mg/kg	15.3	12.9	13.8	14	11.7	11.8	12.1	11.6	10.5	9.1	11.4	14.5	6.3	11.8	13.5	50
Copper	mg/kg	20.4	11.3	18.4	21.4	6.8	6.1	6.2	14.4	12.4	3.4	5.5	28.6	7.2	24.7	38.7	8,100
Iron	mg/kg	26,000	26,200	28,600	27,700	33,800	37,100	38,600	24,000	23,900	28,700	29,600	30,100	23,900	28,600	30,500	150,000
Lead	mg/kg	58.9	19	41.1	71	7.5	6.2	6.4	33.8	16.8	5.5	6.1	69.1	20.1	38.1	32.5	450
Magnesium	mg/kg	4,450	3,950	4,360	4,520	4,780	5,580	6,010	3,350	4,040	3,440	5,240	4,540	2,220	3,140	3,610	NS
Manganese	mg/kg	894	929	1,390	1,110	952	863	829	1,020	473	1,050	296	1,490	704	2,980	4,210	2,000
Molybdenum	mg/kg	ND (1.2)	ND (1.7)	ND (1.4)	ND (1.8)	ND (1.6)	ND (1.8)	ND (1.5)	ND (2.1)	ND (1.4)	ND (1.8)	ND (1.7)	ND (1.9)	ND (2.3)	ND (2.5)	ND (1.8)	650
Nickel	mg/kg	21.9	20.1	22.7	22.9	27.4	29.3	30.6	18.5	20.6	17.8	28.2	24	10.5	18.5	21.3	650
Potassium	mg/kg	1,410	1,240	1,540	1,630	1,490	1,880	1,970	1,190	1,130	992	1,120	1,670	995	1,740	1,810	NS
Selenium	mg/kg	ND (0.30)	ND (0.43)	ND (0.34)	ND (0.44)	ND (0.40)	0.56	ND (0.46)	ND (0.51)	0.35	0.62	0.52	ND (0.45)	0.73	ND (0.82)	ND (0.45)	26
Silver	mg/kg	0.31	0.34	0.29	0.29	0.41	1.6	0.43	0.36	0.28	0.35	0.37	0.31	0.42	0.32	0.25	84
Sodium	mg/kg	323	606	ND (342)	ND (442)	ND (385)	ND (458)	ND (435)	ND (541)	ND (395)	ND (446)	ND (437)	ND (437)	ND (480)	ND (821)	ND (442)	NS
Thallium	mg/kg	ND (1.2)	ND (1.7)	ND (1.4)	ND (1.8)	ND (1.6)	ND (1.8)	ND (1.5)	ND (2.1)	ND (1.4)	ND (1.8)	ND (1.7)	ND (1.8)	ND (2.0)	ND (2.5)	3.1	14
Vanadium	mg/kg	17	22.9	16.3	17.2	21.3	20.2	20.6	18.2	15.7	20.9	19.4	16.2	22.1	29.1	29.8	1,500
Zinc	mg/kg	96.9	78.2	81.4	107	66.3	66.7	69.5	85	67.7	62.8	58.5	122	59.2	98.7	83.6	12,000
Mercury	mg/kg	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.10)	ND (0.23)	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.12)	ND (0.14)	ND (0.12)	10

Table 4.7-1
Analytical Results for Soil
Ely 4/6H Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-4-P1A 5/25/2010	ELY-4-P1B 5/25/2010	ELY-4-P2A 5/25/2010	ELY-4-P2B 5/25/2010	ELY-4-P3A 5/25/2010	ELY-4-P3B 5/25/2010	ELY-4-P3C 5/25/2010	ELY-4-P4A 5/25/2010	ELY-4-P4B 5/25/2010	ELY-4-P5A 5/25/2010	ELY-4-P5B 5/25/2010	ELY-4-P6A 5/25/2010	ELY-4-P6B 5/25/2010	ELY-4-P7A 5/25/2010	ELY-4-P7B 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
VOCs Analyses (8260)																	
1,1,1-Trichloroethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	60
1,2-Dichloroethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0088)	ND (0.0149)	ND (0.0087)	ND (0.0097)	ND (0.0081)	ND (0.0088)	ND (0.0088)	ND (0.0106)	ND (0.0096)	ND (0.0112)	ND (0.0101)	ND (0.0104)	ND (0.0132)	ND (0.0158)	ND (0.0131)	7[2]
1,2-Dichloropropane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	10
2-Butanone (MEK)	mg/kg	ND (0.0088)	ND (0.0149)	ND (0.0087)	ND (0.0097)	0.204	ND (0.0088)	0.0103	0.244	ND (0.0095)	ND (0.0112)	0.0167	0.0318	0.0133	0.0837	0.0562	400
2-Hexanone	mg/kg	ND (0.0088)	ND (0.0149)	ND (0.0087)	ND (0.0097)	ND (0.0081)	ND (0.0088)	ND (0.0088)	ND (0.0106)	ND (0.0096)	ND (0.0112)	ND (0.0101)	ND (0.0104)	ND (0.0132)	ND (0.0158)	ND (0.0131)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0088)	ND (0.0149)	ND (0.0087)	ND (0.0097)	ND (0.0081)	ND (0.0088)	ND (0.0088)	ND (0.0106)	ND (0.0096)	ND (0.0112)	ND (0.0101)	ND (0.0104)	ND (0.0132)	ND (0.0158)	ND (0.0131)	290
Acetone	mg/kg	0.132	0.281	0.123	0.142	0.84	0.0871	0.118	0.654	0.133	0.132	0.302	0.28	0.322	ND (0.820)	ND (0.656)	3,300
Benzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
Bromodichloromethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	8
Bromoform	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	8
Bromomethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	1
Carbon disulfide	mg/kg	0.0143	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	150
Carbon tetrachloride	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
Chlorobenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	10
Chloroethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	23
Chloroform	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	8
Chloromethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.66
Dibromochloromethane	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	8
Ethylbenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	0.0140	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	600
m&p-Xylene	mg/kg	ND (0.0088)	ND (0.0149)	ND (0.0087)	ND (0.0097)	ND (0.0081)	ND (0.0088)	ND (0.0088)	ND (0.0106)	ND (0.0096)	ND (0.0112)	ND (0.0101)	ND (0.0104)	ND (0.0132)	ND (0.0158)	ND (0.0131)	1,000[3]
Methylene Chloride	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	2
Naphthalene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	25
n-Butylbenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	950
n-Propylbenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	290
o-Xylene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	1,000[3]
p-Isopropyltoluene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	0.0187	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	NS
sec-Butylbenzene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	350
Styrene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	24
Tetrachloroethene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
Toluene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	0.344	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	100
TOTAL BTEX	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	0.358	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.66
Trichloroethene	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.5
Vinyl chloride	mg/kg	ND (0.0044)	ND (0.0075)	ND (0.0044)	ND (0.0049)	ND (0.0040)	ND (0.0044)	ND (0.0044)	ND (0.0053)	ND (0.0048)	ND (0.0056)	ND (0.0050)	ND (0.0052)	ND (0.0066)	ND (0.0079)	ND (0.0066)	0.2
Xylene (Total)	mg/kg	ND (0.0088)	ND (0.0149)	ND (0.0087)	ND (0.0097)	ND (0.0081)	ND (0.0088)	ND (0.0088)	ND (0.0106)	ND (0.0096)	ND (0.0112)	ND (0.0101)	ND (0.0104)	ND (0.0132)	ND (0.0158)	ND (0.0131)	1,000

Table 4.7-1
Analytical Results for Soil
Ely 4/6H Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-4-P1A 5/25/2010	ELY-4-P1B 5/25/2010	ELY-4-P2A 5/25/2010	ELY-4-P2B 5/25/2010	ELY-4-P3A 5/25/2010	ELY-4-P3B 5/25/2010	ELY-4-P3C 5/25/2010	ELY-4-P4A 5/25/2010	ELY-4-P4B 5/25/2010	ELY-4-P5A 5/25/2010	ELY-4-P5B 5/25/2010	ELY-4-P6A 5/25/2010	ELY-4-P6B 5/25/2010	ELY-4-P7A 5/25/2010	ELY-4-P7B 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOCs Analyses (8270)																	
1,2,4-Trichlorobenzene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.387)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	27
1,2-Dichlorobenzene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	60
1,3-Dichlorobenzene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	61
1,4-Dichlorobenzene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.912)	ND (0.954)	ND (0.956)	ND (0.970)	ND (0.930)	ND (0.959)	ND (0.889)	ND (1.000)	ND (0.921)	ND (0.950)	ND (0.944)	ND (0.967)	ND (1.060)	ND (1.170)	ND (1.060)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	11
2,4-Dichlorophenol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	2
2,4-Dimethylphenol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	73
2,4-Dinitrophenol	mg/kg	ND (0.912)	ND (0.954)	ND (0.956)	ND (0.970)	ND (0.930)	ND (0.959)	ND (0.889)	ND (1.000)	ND (0.921)	ND (0.950)	ND (0.944)	ND (0.967)	ND (1.060)	ND (1.170)	ND (1.060)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	3.7
2-Chloronaphthalene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	6,200
2-Chlorophenol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	4.4
2-Methylnaphthalene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	180
2-Nitroaniline	mg/kg	ND (0.912)	ND (0.954)	ND (0.956)	ND (0.970)	ND (0.930)	ND (0.959)	ND (0.889)	ND (1.000)	ND (0.921)	ND (0.950)	ND (0.944)	ND (0.967)	ND (1.060)	ND (1.170)	ND (1.060)	11
2-Nitrophenol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.729)	ND (0.737)	ND (0.737)	ND (0.726)	ND (0.745)	ND (0.729)	ND (0.741)	ND (0.801)	ND (0.738)	ND (0.760)	ND (0.755)	ND (0.738)	ND (0.845)	ND (0.903)	ND (0.848)	18[2]
3,3'-Dichlorobenzidine	mg/kg	ND (0.365)	ND (0.353)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	8.3
3-Nitroaniline	mg/kg	ND (0.912)	ND (0.954)	ND (0.956)	ND (0.970)	ND (0.930)	ND (0.959)	ND (0.889)	ND (1.000)	ND (0.951)	ND (0.950)	ND (0.944)	ND (0.967)	ND (1.060)	ND (1.170)	ND (1.060)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.912)	ND (0.954)	ND (0.956)	ND (0.970)	ND (0.930)	ND (0.959)	ND (0.889)	ND (1.000)	ND (0.951)	ND (0.950)	ND (0.944)	ND (0.967)	ND (1.060)	ND (1.170)	ND (1.060)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.369)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	37
4-Chloroaniline	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	NS
4-Nitroaniline	mg/kg	ND (0.912)	ND (0.954)	ND (0.956)	ND (0.970)	ND (0.930)	ND (0.959)	ND (0.889)	ND (1.000)	ND (0.951)	ND (0.950)	ND (0.944)	ND (0.967)	ND (1.060)	ND (1.170)	ND (1.060)	3.3
4-Nitrophenol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	6
Acenaphthene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	2,700
Acenaphthylene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	2,500
Anthracene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	350
Benzo(a)anthracene ,	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	5.7
Benzo(a)pyrene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	180
Benzo(k)fluoranthene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	57
Benzyl alcohol	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	130
Butylbenzylphthalate	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	3,000
Chrysene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	0.57
Dibenzofuran	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	95
Diethylphthalate	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	2,900
Dimethylphthalate	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	NS
Di-n-butylphthalate	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	1500
Di-n-octylphthalate	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	8,800
Fluoranthene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	3,200
Fluorene	mg/kg	ND (0.365)	ND (0.382)	ND (0.382)	ND (0.388)	ND (0.372)	ND (0.384)	ND (0.356)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.387)	ND (0.424)	ND (0.487)	ND (0.423)	3,000

Table 4.7-1
Analytical Results for Soil
Ely 4/6H Wellsite

Dimock, Township
Susquehana County, PA

Sample Identification / Sample Date / Parameter	Units	ELY-4-P1A 5/25/2010	ELY-4-P1B 5/25/2010	ELY-4-P2A 5/25/2010	ELY-4-P2B 5/25/2010	ELY-4-P3A 5/25/2010	ELY-4-P3B 5/25/2010	ELY-4-P3C 5/25/2010	ELY-4-P4A 5/25/2010	ELY-4-P4B 5/25/2010	ELY-4-P5A 5/25/2010	ELY-4-P5B 5/25/2010	ELY-4-P6A 5/25/2010	ELY-4-P6B 5/25/2010	ELY-4-P7A 5/25/2010	ELY-4-P7B 5/25/2010	SOIL Residential Used Aquifer MSCs[1]
SVOCs Analyses (8270)																	
Hexachloro-1,3-butadiene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**10**
Hexachlorobenzene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**0.96**
Hexachlorocyclopentadiene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**91**
Hexachloroethane	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**0.56**
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**5.7**
Isophorone	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**10**
Naphthalene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**25**
Nitrobenzene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**7.3**
N-Nitroso-di-n-propylamine	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**0.0094**
N-Nitrosodiphenylamine	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**20**
Pentachlorophenol	mg/kg	ND (0.912)	ND (0.984)	ND (0.958)	ND (0.920)	ND (0.932)	ND (0.885)	ND (0.896)	ND (1.00)	ND (0.951)	ND (0.950)	ND (0.944)	ND (0.917)	ND (1.06)	ND (1.22)	ND (1.06)	**5**
Phenanthrene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**10,000**
Phenol	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**200**
Pyrene	mg/kg	ND (0.365)	ND (0.393)	ND (0.383)	ND (0.368)	ND (0.372)	ND (0.354)	ND (0.358)	ND (0.401)	ND (0.380)	ND (0.380)	ND (0.377)	ND (0.367)	ND (0.424)	ND (0.487)	ND (0.423)	**2,200**

Notes:
[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.
[2]= ND (0.10) = Parameter not detected at the detection limit specified in parentheses.
[3]=No Standard
[4]=as Chromium III.
[5]=as cis-1, 2 - Dichloroethlene
[6]=as Total xylenes.
[7]=as p-Cresol
29.0 = Residential, Used Aquifer MSC

Table 4.7-2
Analytical Results for Surface Water
Ely 4/6H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		Ely Pond	Ely-DW Seep	Ely-DW Seep D (Field Duplicate)	Surface Water Quality Criteria[1]		
Sample Date		5/26/2010	5/26/2010	5/26/2010	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Parameter	Units						
General Chemistry							
Acidity, Total (SM 2310B)	mg/L	ND (10.0)[2]	ND (10.0)	ND (10.0)	NS[3]	NS	NS
Alkalinity, Total as CaCO3 (SM 2320B)	mg/L	14.0	10.0	20.0	NS	NS	NS
Nitrogen, Ammonia (EPA 350.1)	mg/L	0.11	ND (0.10)	ND (0.10)	NS	NS	NS
Chloride (SM 4500-Cl-E)	mg/L	12.1	4.0	3.9	NS	NS	250
Ethylene Glycol (EPA 8015)	mg/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.10)	ND (0.10)	ND (0.10)	NS	NS	NS
Oil & Grease (1664A)	mg/L	ND (5.2)	ND (4.9)	ND (5.4)	NS	NS	NS
pH	pH units	5.8	5.6	6.9	6.0-9.0		NS
Total Dissolved Solids (SM 2540C)	mg/L	126	83.0	76.0	NS	NS	750
Total Petroleum Hydrocarbons (EPA 1664A)	mg/L	ND (4.6)	ND (4.8)	ND (4.8)	NS	NS	NS
Diesel Components (DRO, EPA 8015B Mod)	mg/L	ND (0.111)	ND (0.111)	ND (0.111)	NS	NS	NS
TPH (C06-C10) (GRO, EPA 8015B Mod)	mg/L	ND (0.200)	ND (0.200)	ND (0.200)	NS	NS	NS
Metals (6010/7470)							
Aluminum, Total	ug/L	111	ND (50.0)	ND (50.0)	NS	750	NS
Antimony, Total	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	220	1,100	5.6
Arsenic, Total	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	150	340	10
Barium, Total	ug/L	53.4	62.8	62.2	4,100	21,000	2,400
Beryllium, Total	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Total	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	1,600	8,100	3,100
Cadmium, Total	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Calcium, Total	ug/L	10,000	8,900	8,930	NS	NS	NS
Chromium, Total	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Cobalt, Total	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	19	95	NS
Copper, Total	ug/L	5.8	ND (5.0)	ND (5.0)	NS	NS	NS
Iron, Total	ug/L	264	ND (50.0)	ND (50.0)	1,500[4]	1,500[4]	NS[4]
Lead, Total	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	NS	NS	NS
Magnesium, Total	ug/L	1,980	1,810	1,800	NS	NS	NS
Manganese, Total	ug/L	92.9	8.9	10.1	NS	NS	1,000
Molybdenum, Total	ug/L	ND (20.0)	ND (20.0)	ND (20.0)	NS	NS	NS
Nickel, Total	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Potassium, Total	ug/L	753	618	625	NS	NS	NS
Selenium, Total	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Silver, Total	ug/L	1.4	ND (1.0)	ND (1.0)	NS	NS	NS
Sodium, Total	ug/L	4,020	2,020	2,140	NS	NS	NS
Thallium, Total	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	13	65	0.24
Vanadium, Total	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	100	510	NS
Zinc, Total	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Mercury, Total	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	NS	NS	NS
Metals (6010/7470)							
Aluminum, Dissolved	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	NS	NS	NS
Antimony, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Arsenic, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Barium, Dissolved	ug/L	44.7	57.4	54.1	NS	NS	NS
Beryllium, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Dissolved	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	NS	NS	NS
Cadmium, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	0.25	2.01	NS
Calcium, Dissolved	ug/L	9,580	8,620	8,460	NS	NS	NS
Chromium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	74.1	569.8	NS
Cobalt, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Copper, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	9.0	13	NS
Iron, Dissolved	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	NS	NS	300
Lead, Dissolved	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	2.5	64.6	NS
Magnesium, Dissolved	ug/L	1,830	1,690	1,620	NS	NS	NS
Manganese, Dissolved	ug/L	24.9	10.7	ND (5.0)	NS	NS	NS
Molybdenum, Dissolved	ug/L	ND (20.0)	ND (20.0)	ND (20.0)	NS	NS	NS
Nickel, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	52	470	610
Potassium, Dissolved	ug/L	620	ND (500)	643	NS	NS	NS
Selenium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	4.6	NS	NS
Silver, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	3.2	NS
Sodium, Dissolved	ug/L	4,200	2,050	2,290	NS	NS	NS
Thallium, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Vanadium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Zinc, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	120	120	NS
Mercury, Dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	0.77	1.4	0.05

Table 4.7-2
Analytical Results for Surface Water
Ely 4/6H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		Ely Pond	Ely-DW Seep	Ely-DW Seep D (Field Duplicate)	Surface Water Quality Criteria[1]		
Sample Date		5/26/2010	5/26/2010	5/26/2010	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Parameter	Units						
VOCs (8260)							
1,1,1-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	610	3,000	NS
1,1,2,2-Tetrachloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	210	1,000	0.17
1,1,2-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	680	3,400	0.59
1,1-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,1-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	1,500	7,500	33
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	26	130	35
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dibromoethane (EDB)	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	160	820	420
1,2-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	3,100	15,000	0.38
1,2-Dichloroethene (Total)	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	NS	NS	NS
1,2-Dichloropropane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	2,200	11,000	NS
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	150	730	420
2-Butanone (MEK)	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	32,000	230,000	21,000
2-Hexanone	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	4,300	21,000	NS
4-Methyl-2-pentanone (MIBK)	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	5,000	26,000	NS
Acetone	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	86,000	450,000	3,500
Benzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	130	640	1.2
Bromochloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Bromodichloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.55
Bromoform	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	370	1,800	4.3
Bromomethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	110	550	47
Carbon disulfide	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon tetrachloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	560	2,800	0.23
Chlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	240	1200	130
Chloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Chloroform	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	390	1,900	5.7
Chloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	5,500	28,000	NS
cis-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
cis-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	61	310	0.34
Dibromochloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.4
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	580	2,900	530
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
m&p-Xylene	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	210[5]	1,100[5]	70,000[5]
Methylene Chloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	2,400	12,000	4.6
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	43	140	NS
n-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
n-Propylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
o-Xylene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	210[5]	1,100[5]	70,000[5]
p-Isopropyltoluene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
sec-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Styrene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Tetrachloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	140	700	0.69
Toluene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	330	1,700	1,300
trans-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	1,400	6,800	140
trans-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	61	310	0.34
Trichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	450	2,300	2.5
Vinyl Chloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.025
Xylene (Total)	ug/L	ND (3.0)	ND (3.0)	ND (3.0)	210	1,100	70,000

Table 4.7-2
Analytical Results for Surface Water
Ely 4/6H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		Ely Pond	Ely-DW Seep	Ely-DW Seep D (Field Duplicate)	Surface Water Quality Criteria[1]		
Sample Date		5/26/2010	5/26/2010	5/26/2010	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Parameter	Units						
SVOCs (8270C)							
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	26	130	35
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	150	730	420
1-Methylnaphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
2,4,5-Trichlorophenol	ug/L	ND (2.5)	ND (2.6)	ND (2.7)	NS	NS	NS
2,4,6-Trichlorophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	91	460	1.4
2,4-Dichlorophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	340	1,700	77
2,4-Dimethylphenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	130	660	380
2,4-Dinitrophenol	ug/L	ND (2.5)	ND (2.6)	ND (2.7)	320	1,600	0.05
2,4-Dinitrotoluene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	130	660	69
2,6-Dinitrotoluene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	200	990	0.05
2-Chloronaphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	1,000
2-Chlorophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
2-Methylnaphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
2-Methylphenol(o-Cresol)	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
2-Nitroaniline	ug/L	ND (2.5)	ND (2.6)	ND (2.7)	NS	NS	NS
2-Nitrophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	1,600	8,000	NS
3&4-Methylphenol(m&p Cresol)	ug/L	ND (2.1)	ND (2.2)	ND (2.2)	NS	NS	NS
3,3'-Dichlorobenzidine	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
3-Nitroaniline	ug/L	ND (2.5)	ND (2.6)	ND (2.7)	NS	NS	NS
4,6-Dinitro-2-methylphenol	ug/L	ND (2.5)	ND (2.6)	ND (2.7)	16	80	13
4-Bromophenylphenyl ether	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	54	270	NS
4-Chloro-3-methylphenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chloroaniline	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chlorophenylphenyl ether	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
4-Nitroaniline	ug/L	ND (2.5)	ND (2.6)	ND (2.7)	NS	NS	NS
4-Nitrophenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	470	2,300	NS
Acenaphthene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	17	83	670
Acenaphthylene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
Anthracene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	8,300
Azobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(a)anthracene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzoic acid	ug/L	ND (7.05)	ND (7.35)	ND (7.69)	NS	NS	NS
Benzyl alcohol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
bis(2-Chloroethoxy)methane	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
bis(2-Chloroethyl) ether	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	6,000	30,000	0.03
bis(2-Chloroisopropyl) ether	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	1,400
bis(2-Ethylhexyl)phthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	910	4,500	1.2
Butylbenzylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	35	140	150
Carbazole	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
Chrysene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenzofuran	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
Diethylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	800	4,000	17,000
Dimethylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
Di-n-butylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	21	110	2,000
Di-n-octylphthalate	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	NS
Fluoranthene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	40	200	130
Fluorene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	1,100
Hexachloro-1,3-butadiene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	2	10	0.44
Hexachlorobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.00028
Hexachlorocyclopentadiene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	1	5	40
Hexachloroethane	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	12	60	1.4
Indeno(1,2,3-cd)pyrene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Isophorone	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	2,100	10,000	35
Naphthalene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	43	140	NS
Nitrobenzene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	810	4,000	17
N-Nitrosodimethylamine	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	3,400	17,000	0.00069
N-Nitroso-di-n-propylamine	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	0.005
N-Nitrosodiphenylamine	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	59	3,000	3.3
Pentachlorophenol	ug/L	ND (2.5)	ND (2.6)	ND (2.7)	0.00589	0.00768	0.27
Phenanthrene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	1	5	NS
Phenol	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	21,000
Pyrene	ug/L	ND (1.0)	ND (1.1)	ND (1.1)	NS	NS	830

Table 4.7-2
Analytical Results for Surface Water
Ely 4/6H Wellsite

Dimock Township
Susquehanna County, PA

Sample Identification		Ely Pond	Ely-DW Seep	Ely-DW Seep D (Field Duplicate)	Surface Water Quality Criteria[1]		
Sample Date		5/26/2010	5/26/2010	5/26/2010	Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
Parameter	Units						
8270 MSSV PAH by SIM							
Acenaphthene	ug/L	ND (2.8)	ND (2.8)	ND (2.7)	17	83	670
Acenaphthylene	ug/L	ND (2.8)	ND (2.8)	ND (2.7)	NS	NS	NS
Anthracene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	8,300
Benzo(a)anthracene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	0.0038
Chrysene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	0.0038
Fluoranthene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	40	200	130
Fluorene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	1,100
Indeno(1,2,3-cd)pyrene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	0.0038
Naphthalene	ug/L	ND (1.0)	ND (1.0)	ND (1.1)	43	140	NS
Phenanthrene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	1	5	NS
Pyrene	ug/L	ND (0.21)	ND (0.21)	ND (0.22)	NS	NS	830

Notes:

[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable. Values provided for chromium are for chromium III. Values for chloride, TDS, pH, manganese and iron from 25 Pa Code Chapter 93.7, Table 3.

[2]= ND (1.0) = Parameter not detected at the detection limit specified in parentheses.

[3]= No Standard.

[4]= The specific water quality criteria for total recoverable iron is for aquatic life uses and is expressed as a 30-day average concentration. The water quality criteria for human health is expressed as dissolved iron. See 25 PA Code Section 93.7.

[5]= As total xylenes.

[5]= As total xylenes.

5.8 = Results exceed SHS surface water quality criteria

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location / Sample Identification / Sample Date / Parameter	Units	*Gesford 2/7* G-7-P1A 5/26/2010	*Gesford 2/7* G-7-P1B 5/26/2010	*Gesford 2/7* G-7-P2A 5/26/2010	*Gesford 2/7* G-7-P2B 5/26/2010	*Gesford 2/7* G-7-P3A 5/26/2010	*Gesford 2/7* G-7-P3B 5/26/2010	*Gesford 2/7* G-7-P4A 5/26/2010	*Gesford 2/7* G-7-P4B 5/26/2010	*Gesford 2/7* G-7-P5A 5/26/2010	*Gesford 2/7* G-7-P5B 5/26/2010	*Gesford 2/7* G-7-P6A 5/26/2010	*Gesford 2/7* G-7-P6B 5/26/2010	*Gesford 2/7* G-7-P7A 5/26/2010	*Gesford 2/7* G-7-P7B 5/26/2010	*Gesford 2/7* G-7-P8A 5/26/2010	*Gesford 2/7* G-7-P8B 5/26/2010	*Gesford 2/7* G-7-P9A 5/26/2010	SOIL Residential Used Aquifer MSCs[2]
General Chemistry Analyses																			
Percent Moisture (ASTM D2974-87)	%	17.0	14.0	10.8	9.2	8.7	12.3	9.0	8.8	8.1	11.6	9.4	9.5	8.7	9.9	7.7	12.6	11.9	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	14.5	15.9	7.3	ND (5.2)	ND (5.2)	ND (5.3)	8.9	ND (5.3)	8.1	ND (5.2)	ND (5.2)	6.8	5.3	8.0	5.7	9.5	14.8	1,900
MBAS (SM 5540C)	mg/L	ND (0.10)[2]	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	0.18	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	NS
Chloride (SM 4500-Cl-E)	mg/L	3.3	3.7	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	4.3	ND (3.0)	3.1	5.8	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	3.3	NS
Metals Analyses (6010B/7471)																			
Aluminum	mg/kg	12,200	13,700	14,400	12,500	14,100	15,000	13,200	12,900	14,200	14,600	12,600	12,900	14,200	14,700	11,100	16,600	13,400	190,000
Antimony	mg/kg	ND (0.48)	ND (0.38)	ND (0.34)	ND (0.32)	ND (0.48)	0.43	0.78	ND (0.52)	0.61	ND (0.42)	ND (0.37)	ND (0.33)	ND (0.38)	0.63	0.47	0.69	ND (0.48)	27
Arsenic	mg/kg	23.5	30.9	14	15.4	22.8	12.2	19.7	16.4	14.3	13.7	14.8	11.1	15.8	12.9	26.3	9.1	42.6	12
Barium	mg/kg	1,840	1,430	137	112	146	123	225	135	182	147	120	298	173	144	139	160	198	8,200
Beryllium	mg/kg	0.67	0.76	0.78	0.7	0.82	0.81	0.82	0.74	0.77	0.82	0.7	0.62	0.76	0.81	0.9	0.81	0.83	320
Boron	mg/kg	8.7	8.5	8	7.3	8.3	7.8	8	8.6	8	8.1	7.3	6.9	7.9	8.2	8.3	7.7	8.4	1,900
Cadmium	mg/kg	0.48	0.51	0.37	0.35	0.42	0.44	0.54	0.46	0.37	0.39	0.44	0.46	0.62	0.43	0.61	0.48	0.49	38
Calcium	mg/kg	4,510	5,520	1,760	2,770	1,600	832	1,620	1,710	1,280	1,380	1,990	3070	1,480	1,420	1,890	1,110	3,880	NS
Chromium	mg/kg	14.6	15.8	16.3	13.9	15.3	15.6	14.2	13.8	15.3	15.9	14	14.4	15.4	16	15.2	17.1	15.7	190,000[4]
Cobalt	mg/kg	14.3	15.3	11.8	10.5	13.1	12.3	19.1	12.2	12.9	12.5	12.1	10.4	13.2	12.5	10.3	13	17	50
Copper	mg/kg	19.2	16.1	17.8	16.7	18.1	18.3	19.2	16.2	16.8	17.7	17.1	15.7	17.3	16.7	23.1	18.2	21.4	8,100
Iron	mg/kg	24,600	26,900	27,500	25,200	27,600	26,600	30,400	25,400	26,500	27,900	25,500	22500	27,200	28,200	31,500	26,900	27,200	150,000
Lead	mg/kg	38.5	35.8	14.4	16.1	18.1	12.8	29.7	18.1	17.5	15.2	17	22.2	15.4	13	216	12.3	58	450
Magnesium	mg/kg	4,720	4,750	4,490	4,350	4,410	4,360	4,100	4,040	4,220	4,500	4,200	3750	4,420	4,440	3,250	4,470	5,300	NS
Manganese	mg/kg	1,000	1,400	804	580	1,090	846	2,660	1,000	1,070	1,000	843	689	1,120	918	723	1,360	1,580	2,000
Molybdenum	mg/kg	ND (2.0)	ND (1.5)	ND (1.4)	ND (1.3)	ND (1.9)	ND (1.9)	ND (1.9)	ND (2.1)	ND (1.5)	ND (1.7)	ND (1.5)	ND (1.3)	ND (1.5)	ND (1.7)	ND (1.5)	ND (1.5)	ND (1.9)	650
Nickel	mg/kg	22.3	24.2	23.2	21.7	24.2	22.2	28.1	23	22.9	24.4	22	19.1	24.7	23.8	19.3	24.7	26.8	650
Potassium	mg/kg	1,880	1,920	1,870	2,030	1,920	1,900	1,730	1,980	1,780	1,890	1,810	1670	1,850	1,850	1,700	1,930	1,840	NS
Selenium	mg/kg	0.65	ND (0.58)	ND (0.34)	ND (0.32)	ND (0.48)	ND (0.32)	ND (0.48)	ND (0.52)	ND (0.37)	ND (0.42)	ND (0.37)	ND (0.33)	ND (0.38)	ND (0.41)	ND (0.36)	ND (0.40)	ND (0.48)	26
Silver	mg/kg	0.34	0.3	0.27	0.28	0.29	0.88	1.1	1.3	0.95	1.1	0.83	0.82	1	1.1	1.2	1	1.1	84
Sodium	mg/kg	ND (454)	ND (293)	ND (335)	ND (324)	ND (464)	ND (317)	ND (458)	ND (517)	ND (370)	ND (423)	ND (388)	ND (328)	ND (360)	ND (414)	ND (378)	ND (397)	ND (481)	NS
Thallium	mg/kg	ND (5.0)	ND (4.5)	ND (4.4)	ND (4.3)	ND (4.3)	ND (4.3)	ND (4.8)	ND (2.1)	ND (4.5)	ND (4.7)	ND (4.5)	ND (4.3)	ND (4.5)	ND (4.7)	ND (4.8)	ND (4.8)	ND (4.9)	14
Vanadium	mg/kg	13.8	15.4	16.2	14.3	16.3	16.6	17.9	15.1	16.2	16.6	14.6	15.5	16.1	17.2	29.9	17.5	15.6	1,500
Zinc	mg/kg	62	71.3	70.6	69.7	73	68.1	71.5	71	69.5	72.9	70.5	60.7	72.2	70.8	68.4	72.6	74.2	12,000
Mercury	mg/kg	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.11)	ND (0.11)	ND (0.11)	ND (0.10)	ND (0.11)	ND (0.10)	ND (0.11)	ND (0.11)	10

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location / Sample Identification / Sample Date / Parameter	Units	Gesford 2/7 G-7-P1A 5/26/2010	Gesford 2/7 G-7-P1B 5/26/2010	Gesford 2/7 G-7-P2A 5/26/2010	Gesford 2/7 G-7-P2B 5/26/2010	Gesford 2/7 G-7-P3A 5/26/2010	Gesford 2/7 G-7-P3B 5/26/2010	Gesford 2/7 G-7-P4A 5/26/2010	Gesford 2/7 G-7-P4B 5/26/2010	Gesford 2/7 G-7-P5A 5/26/2010	Gesford 2/7 G-7-P5B 5/26/2010	Gesford 2/7 G-7-P6A 5/26/2010	Gesford 2/7 G-7-P6B 5/26/2010	Gesford 2/7 G-7-P7A 5/26/2010	Gesford 2/7 G-7-P7B 5/26/2010	Gesford 2/7 G-7-P8A 5/26/2010	Gesford 2/7 G-7-P8B 5/26/2010	Gesford 2/7 G-7-P9A 5/26/2010	SOIL Residential Used Aquifer MSCs[2]
VOCs (8260)																			
1,1,1-Trichloroethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.7
1,2,4-Trimethylbenzene	mg/kg	0.0060	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	60
1,2-Dichloroethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0092)	ND (0.0104)	ND (0.0104)	ND (0.0090)	ND (0.0083)	ND (0.0091)	ND (0.0083)	ND (0.0088)	ND (0.0106)	ND (0.0085)	ND (0.0093)	ND (0.0082)	ND (0.0097)	ND (0.0094)	ND (0.0103)	ND (0.0096)	ND (0.0086)	7[5]
1,2-Dichloropropane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	10
2-Butanone (MEK)	mg/kg	ND (0.0092)	ND (0.0104)	ND (0.0104)	ND (0.0090)	ND (0.0083)	ND (0.0091)	ND (0.0083)	ND (0.0088)	ND (0.0106)	ND (0.0085)	ND (0.0093)	ND (0.0082)	ND (0.0097)	ND (0.0094)	ND (0.0103)	ND (0.0096)	ND (0.0086)	400
2-Hexanone	mg/kg	ND (0.0092)	ND (0.0104)	ND (0.0104)	ND (0.0090)	ND (0.0083)	ND (0.0091)	ND (0.0083)	ND (0.0088)	ND (0.0106)	ND (0.0085)	ND (0.0093)	ND (0.0082)	ND (0.0097)	ND (0.0094)	ND (0.0103)	ND (0.0096)	ND (0.0086)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0092)	ND (0.0104)	ND (0.0104)	ND (0.0090)	ND (0.0083)	ND (0.0091)	ND (0.0083)	ND (0.0088)	ND (0.0106)	ND (0.0085)	ND (0.0093)	ND (0.0082)	ND (0.0097)	ND (0.0094)	ND (0.0103)	ND (0.0096)	ND (0.0086)	290
Acetone	mg/kg	0.0979	0.100	0.118	0.0175	0.0333	0.0461	0.0381	0.0252	0.0895	0.0227	0.0238	0.0707	0.0204	0.0343	0.0148	0.0355	0.137	3,300
Benzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
Bromodichloromethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	8
Bromoform	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	8
Bromomethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	1
Carbon disulfide	mg/kg	0.0236	0.0168	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	0.0128	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	0.0252	150
Carbon tetrachloride	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
Chlorobenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	10
Chloroethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	23
Chloroform	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	8
Chloromethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.66
Dibromochloromethane	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	8
Ethylbenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	600
m&p-Xylene	mg/kg	ND (0.0092)	ND (0.0104)	ND (0.0104)	ND (0.0090)	ND (0.0083)	ND (0.0091)	ND (0.0083)	ND (0.0088)	ND (0.0106)	ND (0.0085)	ND (0.0093)	ND (0.0082)	ND (0.0097)	ND (0.0094)	ND (0.0103)	ND (0.0096)	ND (0.0086)	1,000[6]
Methylene Chloride	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	2
Naphthalene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	25
n-Butylbenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	950
n-Propylbenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	290
o-Xylene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	1,000[6]
p-Isopropyltoluene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	NS
sec-Butylbenzene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	350
Styrene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	24
Tetrachloroethene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	0.085	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
Toluene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	100
TOTAL BTEX	mg/kg	ND (0.0276)	ND (0.0312)	ND (0.0312)	ND (0.0270)	ND (0.0249)	ND (0.0276)	ND (0.0249)	ND (0.0264)	ND (0.0318)	ND (0.0258)	ND (0.0282)	ND (0.0246)	ND (0.0291)	ND (0.0282)	ND (0.0309)	ND (0.0288)	ND (0.0258)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.66
Trichloroethene	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0.5
Vinyl chloride	mg/kg	ND (0.0046)	ND (0.0052)	ND (0.0052)	ND (0.0045)	ND (0.0041)	ND (0.0046)	ND (0.0041)	ND (0.0044)	ND (0.0053)	ND (0.0043)	ND (0.0047)	ND (0.0041)	ND (0.0048)	ND (0.0047)	ND (0.0051)	ND (0.0048)	ND (0.0043)	0
Xylene (Total)	mg/kg	ND (0.0138)	ND (0.0156)	ND (0.0156)	ND (0.0135)	ND (0.0124)	ND (0.0138)	ND (0.0124)	ND (0.0132)	ND (0.0159)	ND (0.0129)	ND (0.0140)	ND (0.0123)	ND (0.0145)	ND (0.0140)	ND (0.0154)	ND (0.0144)	ND (0.0129)	1,000

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location / Sample Identification / Sample Date / Parameter	Units	Gesford 2/7 G-7-P1A 5/26/2010	Gesford 2/7 G-7-P1B 5/26/2010	Gesford 2/7 G-7-P2A 5/26/2010	Gesford 2/7 G-7-P2B 5/26/2010	Gesford 2/7 G-7-P3A 5/26/2010	Gesford 2/7 G-7-P3B 5/26/2010	Gesford 2/7 G-7-P4A 5/26/2010	Gesford 2/7 G-7-P4B 5/26/2010	Gesford 2/7 G-7-P5A 5/26/2010	Gesford 2/7 G-7-P5B 5/26/2010	Gesford 2/7 G-7-P6A 5/26/2010	Gesford 2/7 G-7-P6B 5/26/2010	Gesford 2/7 G-7-P7A 5/26/2010	Gesford 2/7 G-7-P7B 5/26/2010	Gesford 2/7 G-7-P8A 5/26/2010	Gesford 2/7 G-7-P8B 5/26/2010	Gesford 2/7 G-7-P9A 5/26/2010	SOIL Residential Used Aquifer MSCs[2]
SVOCs (8270)																			
1,2,4-Trichlorobenzene	mg/kg	ND (0.386)	ND (0.381)	ND (0.370)	ND (0.360)	ND (0.393)	ND (0.368)	ND (0.359)	ND (0.359)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	27
1,2-Dichlorobenzene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	60
1,3-Dichlorobenzene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	61
1,4-Dichlorobenzene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.809)	ND (0.952)	ND (0.925)	ND (0.900)	ND (0.983)	ND (0.920)	ND (0.897)	ND (0.895)	ND (0.885)	ND (0.918)	ND (0.914)	ND (0.915)	ND (0.894)	ND (0.952)	ND (0.934)	ND (0.947)	ND (0.973)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	11
2,4-Dichlorophenol	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	2
2,4-Dimethylphenol	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	73
2,4-Dinitrophenol	mg/kg	ND (0.809)	ND (0.952)	ND (0.925)	ND (0.900)	ND (0.983)	ND (0.920)	ND (0.897)	ND (0.895)	ND (0.885)	ND (0.918)	ND (0.914)	ND (0.915)	ND (0.894)	ND (0.952)	ND (0.934)	ND (0.947)	ND (0.973)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	3.7
2-Chloronaphthalene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	6,200
2-Chlorophenol	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	4.4
2-Methylnaphthalene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	180
2-Nitroaniline	mg/kg	ND (0.809)	ND (0.952)	ND (0.925)	ND (0.900)	ND (0.983)	ND (0.920)	ND (0.897)	ND (0.895)	ND (0.885)	ND (0.918)	ND (0.914)	ND (0.915)	ND (0.894)	ND (0.952)	ND (0.934)	ND (0.947)	ND (0.973)	11
2-Nitrophenol	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.791)	ND (0.781)	ND (0.740)	ND (0.719)	ND (0.708)	ND (0.736)	ND (0.717)	ND (0.713)	ND (0.709)	ND (0.734)	ND (0.730)	ND (0.732)	ND (0.713)	ND (0.762)	ND (0.707)	ND (0.757)	ND (0.736)	18[6]
3,3'-Dichlorobenzidine	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	8.3
3-Nitroaniline	mg/kg	ND (0.809)	ND (0.952)	ND (0.925)	ND (0.900)	ND (0.983)	ND (0.920)	ND (0.897)	ND (0.895)	ND (0.885)	ND (0.918)	ND (0.914)	ND (0.915)	ND (0.894)	ND (0.952)	ND (0.934)	ND (0.947)	ND (0.973)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.809)	ND (0.952)	ND (0.925)	ND (0.900)	ND (0.983)	ND (0.920)	ND (0.897)	ND (0.895)	ND (0.885)	ND (0.918)	ND (0.914)	ND (0.915)	ND (0.894)	ND (0.952)	ND (0.934)	ND (0.947)	ND (0.973)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	37
4-Chloroaniline	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	NS
4-Nitroaniline	mg/kg	ND (0.809)	ND (0.952)	ND (0.925)	ND (0.900)	ND (0.983)	ND (0.920)	ND (0.897)	ND (0.895)	ND (0.885)	ND (0.918)	ND (0.914)	ND (0.915)	ND (0.894)	ND (0.952)	ND (0.934)	ND (0.947)	ND (0.973)	3.3
4-Nitrophenol	mg/kg	ND (0.809)	ND (0.952)	ND (0.925)	ND (0.900)	ND (0.983)	ND (0.920)	ND (0.897)	ND (0.895)	ND (0.885)	ND (0.918)	ND (0.914)	ND (0.915)	ND (0.894)	ND (0.952)	ND (0.934)	ND (0.947)	ND (0.973)	6
Acenaphthene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	2,700
Acenaphthylene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	2,500
Anthracene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	350
Benzo(a)anthracene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	5.7
Benzo(a)pyrene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	180
Benzo(k)fluoranthene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	57
Benzyl alcohol	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	130
Butylbenzylphthalate	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	3,000
Chrysene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	0.57
Dibenzofuran	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	95
Diethylphthalate	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	2,900
Dimethylphthalate	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	NS
Di-n-butylphthalate	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	1,500
Di-n-octylphthalate	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	8,800
Fluoranthene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	3,200
Fluorene	mg/kg	ND (0.395)	ND (0.391)	ND (0.379)	ND (0.369)	ND (0.360)	ND (0.368)	ND (0.358)	ND (0.358)	ND (0.354)	ND (0.367)	ND (0.365)	ND (0.366)	ND (0.358)	ND (0.381)	ND (0.363)	ND (0.378)	ND (0.389)	3,000

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location / Sample Identification / Sample Date / Parameter	Units	*Gesford 2/7* G-7-P1A 5/26/2010	*Gesford 2/7* G-7-P1B 5/26/2010	*Gesford 2/7* G-7-P2A 5/26/2010	*Gesford 2/7* G-7-P2B 5/26/2010	*Gesford 2/7* G-7-P3A 5/26/2010	*Gesford 2/7* G-7-P3B 5/26/2010	*Gesford 2/7* G-7-P4A 5/26/2010	*Gesford 2/7* G-7-P4B 5/26/2010	*Gesford 2/7* G-7-P5A 5/26/2010	*Gesford 2/7* G-7-P5B 5/26/2010	*Gesford 2/7* G-7-P6A 5/26/2010	*Gesford 2/7* G-7-P6B 5/26/2010	*Gesford 2/7* G-7-P7A 5/26/2010	*Gesford 2/7* G-7-P7B 5/26/2010	*Gesford 2/7* G-7-P8A 5/26/2010	*Gesford 2/7* G-7-P8B 5/26/2010	*Gesford 2/7* G-7-P9A 5/26/2010	SOIL Residential Used Aquifer MSCs[2]
SVOCs (8270)																			
Hexachloro-1,3-butadiene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	10
Hexachlorobenzene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	91
Hexachloroethane	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	6
Isophorone	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	10
Naphthalene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	25
Nitrobenzene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	7.3
N-Nitroso-di-n-propylamine	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	0.0094
N-Nitrosodiphenylamine	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	20
Pentachlorophenol	mg/kg	ND (0.962)	ND (0.952)	ND (0.925)	ND (0.950)	ND (0.883)	ND (0.920)	ND (0.891)	ND (0.895)	ND (0.885)	ND (0.968)	ND (0.914)	ND (0.894)	ND (0.895)	ND (0.952)	ND (0.884)	ND (0.947)	ND (0.923)	5
Phenanthrene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	10,000
Phenol	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	200
Pyrene	mg/kg	ND (0.395)	ND (0.381)	ND (0.370)	ND (0.380)	ND (0.353)	ND (0.368)	ND (0.356)	ND (0.358)	ND (0.354)	ND (0.387)	ND (0.365)	ND (0.358)	ND (0.358)	ND (0.381)	ND (0.353)	ND (0.379)	ND (0.369)	2,200

Notes:
All results in milligram per kilogram (mg/kg) unless otherwise stated.
[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.
[2]= ND (0.10) = Parameter not detected at the detection limit specified in parentheses.
[3]=No Standard
[4]=as Chromium III.
[5]=as cis-1, 2 - Dichloroethlene
[6]=as Total xylenes.
[7]=as p-Cresol
23.5 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location **Sample Identification** Sample Date Parameter	Units	*Gesford 2/7* **G-7-P9B** 5/26/2010	*Gesford 2/7* **G-7-P10A** 5/26/2010	*Gesford 2/7* **G-7-P10B** 5/26/2010	*Gesford 2/7* **G-7-P11A** 5/26/2010	*Gesford 2/7* **G-7-P11B** 5/26/2010	*Gesford 2/7* **G-7-P11C** 5/26/2010	*Gesford 2/7* **G-7-P12A** 5/26/2010	*Gesford 2/7* **G-7-P12B** 5/26/2010	*Gesford 2/7* **G-7-P13A** 5/26/2010	*Gesford 2/7* **G-7-P13B** 5/26/2010	*Gesford 2/7* **G-7-P14A** 5/26/2010	*Gesford 2/7* **G-7-P14B** 5/26/2010	*Gesford 2/7* **G-7-P15A** 5/26/2010	*Gesford 2/7* **G-7-P15B** 5/26/2010	*Gesford 2/7* **G-7-P16A** 5/26/2010	*Gesford 2/7* **G-7-P16B** 5/26/2010	SOIL **Residential Used Aquifer MSCs[1]**
General Chemistry Analyses																		
Percent Moisture (ASTM D2974-87)	%	9.7	9	9.4	9.9	9.5	10.8	9.5	9.0	11.2	10.6	10.5	10.3	9.1	10.9	10.1	10.2	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	14.7	ND (3.3)	ND (4.6)	5.5	ND (5.2)	ND (5.5)	8.8	ND (5.0)	18.6	ND (5.3)	6.9	ND (4.8)	ND (5.5)	ND (6.5)[2]	5.4	ND (4.8)	1900
MBAS (SM 5540C)	mg/L	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	ND (0.10)	NS
Chloride (SM 4500-Cl-E)	mg/L	3.5	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	NS
Metals Analyses (6010B/7471)																		
Aluminum	mg/kg	10,400	14,800	13,600	14,500	13,600	13,600	17,900	13,200	15,300	12,000	15,700	13,500	15,600	14,500	15,000	12,800	190,000
Antimony	mg/kg	ND (0.32)	ND (0.37)	ND (0.34)	ND (0.36)	ND (0.32)	ND (0.35)	ND (0.43)	ND (0.37)	0.64	ND (0.33)	ND (0.41)	0.62	ND (0.33)	ND (0.28)	ND (0.37)	ND (0.42)	27
Arsenic	mg/kg	27.5	11.6	12	14.5	19.9	14.5	11.3	15.3	13.6	16.8	20.8	16.9	18.6	18.5	17.5	13.6	12
Barium	mg/kg	427	141	215	164	126	117	176	125	117	133	157	134	183	145	170	145	8,200
Beryllium	mg/kg	0.57	0.9	0.7	0.71	0.76	0.75	0.78	0.73	0.73	0.61	0.89	0.73	0.9	0.83	0.79	0.67	320
Boron	mg/kg	5.8	7.4	6.8	7.3	6	7.4	7.8	6.7	6.6	5.5	7.8	7.5	7.8	7.3	7.1	6.9	1900
Cadmium	mg/kg	0.36	0.44	0.36	0.41	0.37	0.46	0.47	0.39	0.37	0.42	0.39	0.57	0.4	0.56	0.58	0.46	38
Calcium	mg/kg	5,160	1,060	1,610	1,770	1,970	2,040	1,630	1,960	917	1,690	1,420	1,650	2,060	1,940	1,290	1,660	NS
Chromium	mg/kg	12.9	16.4	14.9	16.1	14.4	15.7	17.8	14.4	16.2	12.9	17.7	14	17	15.4	16.9	14	190,000[4]
Cobalt	mg/kg	13	12.6	12.1	12.3	11.9	11.7	12	12.1	11.2	11.3	13.8	13.9	13.2	13.5	13.1	11.5	50
Copper	mg/kg	12.9	18.1	17.6	14.5	17.8	17.4	17.3	18.2	15.4	15.5	18.5	19	20.3	19	18.2	28	8,100
Iron	mg/kg	21,900	27,200	24,900	28,300	25,700	27,800	25,300	25,500	25,600	23,700	30,200	26,200	30,200	28,100	28,700	25,000	150,000
Lead	mg/kg	35.7	12.8	13.6	13.4	19	13.3	16.6	14.2	18.9	21.6	27.3	25.3	19.2	18.9	26.7	17.5	450
Magnesium	mg/kg	4,570	4,630	4,090	4,620	4,030	4,400	4,370	4,080	4,020	3,850	4,950	4,140	4,910	4,460	4,620	4,030	NS
Manganese	mg/kg	910	804	665	978	772	623	1,450	912	820	810	902	1,230	1,090	1,220	909	630	2,000
Molybdenum	mg/kg	ND (1.3)	ND (1.5)	ND (1.4)	ND (1.5)	ND (1.3)	ND (1.4)	ND (1.8)	ND (1.5)	ND (1.5)	ND (1.3)	ND (1.5)	ND (2.1)	ND (1.3)	ND (1.2)	ND (1.5)	ND (1.7)	650
Nickel	mg/kg	20.8	24.2	21.2	25.6	22.7	22.8	24.4	23.3	21.8	21	26.7	24.7	26.5	26.3	26.2	21.5	650
Potassium	mg/kg	1,300	1,930	1,710	1,600	1,780	1,720	1,940	1,690	1,500	1,380	1,670	1,810	1,690	1,680	1,510	1,420	NS
Selenium	mg/kg	ND (0.32)	ND (0.37)	ND (0.34)	ND (0.36)	ND (0.32)	ND (0.35)	ND (0.43)	ND (0.37)	ND (0.46)	ND (0.33)	ND (0.41)	ND (0.53)	ND (0.33)	ND (0.28)	ND (0.37)	ND (0.42)	26
Silver	mg/kg	0.73	0.84	0.78	0.94	0.58	0.93	0.87	0.65	0.64	0.46	0.79	0.75	0.77	0.75	0.88	0.82	84
Sodium	mg/kg	ND (522)	ND (598)	ND (549)	ND (584)	ND (513)	ND (566)	ND (695)	ND (598)	ND (752)	ND (533)	ND (665)	ND (858)	ND (535)	ND (728)	ND (611)	ND (675)	NS
Thallium	mg/kg	ND (1.3)	ND (1.5)	ND (1.4)	ND (1.5)	ND (1.3)	ND (1.4)	ND (1.8)	ND (1.5)	ND (1.9)	ND (1.3)	ND (1.7)	ND (2.1)	ND (1.3)	ND (1.2)	ND (1.5)	ND (1.7)	14
Vanadium	mg/kg	11.9	16.1	15.9	16.9	15.3	15.8	19.7	14.8	18.2	13.3	17.5	15.1	17.6	16.4	16.7	14.8	1,500
Zinc	mg/kg	57.9	69.5	70.1	70.6	67.3	72.2	75.2	65.3	67	72.2	74.1	74.8	73.7	70.2	73.1	69.5	12,000
Mercury	mg/kg	ND (0.12)	ND (0.11)	ND (0.10)	ND (0.10)	ND (0.11)	ND (0.11)	ND (0.13)	ND (0.10)	ND (0.11)	ND (0.11)	ND (0.13)	ND (0.13)	ND (0.12)	ND (0.11)	ND (0.11)	ND (0.13)	10

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location **Sample Identification** Sample Date Parameter	Units	*Gesford 2/7* **G-7-P9B** 5/26/2010	*Gesford 2/7* **G-7-P10A** 5/26/2010	*Gesford 2/7* **G-7-P10B** 5/26/2010	*Gesford 2/7* **G-7-P11A** 5/26/2010	*Gesford 2/7* **G-7-P11B** 5/26/2010	*Gesford 2/7* **G-7-P11C** 5/26/2010	*Gesford 2/7* **G-7-P12A** 5/26/2010	*Gesford 2/7* **G-7-P12B** 5/26/2010	*Gesford 2/7* **G-7-P13A** 5/26/2010	*Gesford 2/7* **G-7-P13B** 5/26/2010	*Gesford 2/7* **G-7-P14A** 5/26/2010	*Gesford 2/7* **G-7-P14B** 5/26/2010	*Gesford 2/7* **G-7-P15A** 5/26/2010	*Gesford 2/7* **G-7-P15B** 5/26/2010	*Gesford 2/7* **G-7-P16A** 5/26/2010	*Gesford 2/7* **G-7-P16B** 5/26/2010	**SOIL** **Residential Used Aquifer MSCs**[1]
VOCs (8260)																		
1,1,1-Trichloroethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**20**
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.08**
1,1,2-Trichloroethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
1,1-Dichloroethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**3.1**
1,1-Dichloroethene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.7**
1,2,4-Trimethylbenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**8.4**
1,2-Dichlorobenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**60**
1,2-Dichloroethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
1,2-Dichloroethene (Total)	mg/kg	ND (0.0081)	ND (0.0092)	ND (0.0108)	ND (0.0108)	ND (0.0088)	ND (0.0156)	ND (0.0098)	ND (0.0106)	ND (0.0112)	ND (0.0120)	ND (0.0134)	ND (0.0084)	ND (0.0107)	ND (0.0078)	ND (0.0100)	ND (0.0092)	**7**[5]
1,2-Dichloropropane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
1,3,5-Trimethylbenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**2.3**
1,3-Dichlorobenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**61**
1,4-Dichlorobenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**10**
2-Butanone (MEK)	mg/kg	ND (0.0081)	ND (0.0092)	ND (0.0108)	ND (0.0108)	ND (0.0088)	ND (0.0156)	ND (0.0098)	ND (0.0106)	ND (0.0112)	ND (0.0120)	ND (0.0134)	ND (0.0084)	ND (0.0107)	ND (0.0078)	ND (0.0100)	ND (0.0092)	**400**
2-Hexanone	mg/kg	ND (0.0081)	ND (0.0092)	ND (0.0108)	ND (0.0108)	ND (0.0088)	ND (0.0156)	ND (0.0098)	ND (0.0106)	ND (0.0112)	ND (0.0120)	ND (0.0134)	ND (0.0084)	ND (0.0107)	ND (0.0078)	ND (0.0100)	ND (0.0092)	**1.1**
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0081)	ND (0.0092)	ND (0.0108)	ND (0.0108)	ND (0.0088)	ND (0.0156)	ND (0.0098)	ND (0.0106)	ND (0.0112)	ND (0.0120)	ND (0.0134)	ND (0.0084)	ND (0.0107)	ND (0.0078)	ND (0.0100)	ND (0.0092)	**290**
Acetone	mg/kg	0.127	0.0283	0.0216	0.0941	0.015	0.0312	0.0302	0.017	0.0363	0.0336	0.0385	0.0115	0.0455	0.0188	0.0454	0.0146	**3300**
Benzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
Bromodichloromethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**8**
Bromoform	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**8**
Bromomethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**1**
Carbon disulfide	mg/kg	0.0327	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**150**
Carbon tetrachloride	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
Chlorobenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**10**
Chloroethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**23**
Chloroform	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**8**
Chloromethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**3**
cis-1,2-Dichloroethene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**7**
cis-1,3-Dichloropropene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.66**
Dibromochloromethane	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**8**
Ethylbenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**70**
Isopropylbenzene (Cumene)	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**600**
m&p-Xylene	mg/kg	ND (0.0081)	ND (0.0092)	ND (0.0108)	ND (0.0108)	ND (0.0088)	ND (0.0156)	ND (0.0098)	ND (0.0106)	ND (0.0112)	ND (0.0120)	ND (0.0134)	ND (0.0084)	ND (0.0107)	ND (0.0078)	ND (0.0100)	ND (0.0092)	**1,000**[6]
Methylene Chloride	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
Methyl-tert-butyl ether	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**2**
Naphthalene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**25**
n-Butylbenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**950**
n-Propylbenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**290**
o-Xylene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**1,000**[6]
p-Isopropyltoluene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**NS**
sec-Butylbenzene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**350**
Styrene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**24**
Tetrachloroethene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
Toluene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**100**
TOTAL BTEX	mg/kg	ND (0.0244)	ND (0.0271)	ND (0.0324)	ND (0.0324)	ND (0.0265)	ND (0.0478)	ND (0.0294)	ND (0.0318)	ND (0.0336)	ND (0.0360)	ND (0.0341)	ND (0.0252)	ND (0.0321)	ND (0.0235)	ND (0.0300)	ND (0.0277)	**NS**
trans-1,2-Dichloroethene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**10**
trans-1,3-Dichloropropene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.66**
Trichloroethene	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0.5**
Vinyl **chloride**	mg/kg	ND (0.0041)	ND (0.0045)	ND (0.0054)	ND (0.0054)	ND (0.0044)	ND (0.0060)	ND (0.0049)	ND (0.0053)	ND (0.0056)	ND (0.0060)	ND (0.0057)	ND (0.0042)	ND (0.0054)	ND (0.0039)	ND (0.0050)	ND (0.0046)	**0**
Xylene (Total)	mg/kg	ND (0.0122)	ND (0.0136)	ND (0.0162)	ND (0.0162)	ND (0.0132)	ND (0.0180)	ND (0.0147)	ND (0.0159)	ND (0.0168)	ND (0.0180)	ND (0.0171)	ND (0.0126)	ND (0.0161)	ND (0.0117)	ND (0.0150)	ND (0.0138)	**1,000**

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location **Sample Identification** Sample Date Parameter	Units	*Gesford 2/7* **G-7-P9B** 5/26/2010	*Gesford 2/7* **G-7-P10A** 5/26/2010	*Gesford 2/7* **G-7-P10B** 5/26/2010	*Gesford 2/7* **G-7-P11A** 5/26/2010	*Gesford 2/7* **G-7-P11B** 5/26/2010	*Gesford 2/7* **G-7-P11C** 5/26/2010	*Gesford 2/7* **G-7-P12A** 5/26/2010	*Gesford 2/7* **G-7-P12B** 5/26/2010	*Gesford 2/7* **G-7-P13A** 5/26/2010	*Gesford 2/7* **G-7-P13B** 5/26/2010	*Gesford 2/7* **G-7-P14A** 5/26/2010	*Gesford 2/7* **G-7-P14B** 5/26/2010	*Gesford 2/7* **G-7-P15A** 5/26/2010	*Gesford 2/7* **G-7-P15B** 5/26/2010	*Gesford 2/7* **G-7-P16A** 5/26/2010	*Gesford 2/7* **G-7-P16B** 5/26/2010	**SOIL** **Residential Used Aquifer MSCs**[1]
SVOCs (8270)																		
1,2,4-Trichlorobenzene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**27**
1,2-Dichlorobenzene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**60**
1,3-Dichlorobenzene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**61**
1,4-Dichlorobenzene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**10**
2,4,5-Trichlorophenol	mg/kg	ND (0.905)	ND (0.882)	ND (0.813)	ND (0.813)	ND (0.815)	ND (0.820)	ND (0.821)	ND (0.882)	ND (0.811)	ND (0.810)	ND (0.807)	ND (0.808)	ND (0.805)	ND (0.823)	ND (0.800)	ND (0.807)	**2,300**
2,4,6-Trichlorophenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**11**
2,4-Dichlorophenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**2**
2,4-Dimethylphenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**73**
2,4-Dinitrophenol	mg/kg	ND (0.905)	ND (0.882)	ND (0.813)	ND (0.813)	ND (0.815)	ND (0.820)	ND (0.821)	ND (0.882)	ND (0.811)	ND (0.810)	ND (0.807)	ND (0.808)	ND (0.805)	ND (0.823)	ND (0.800)	ND (0.807)	**7.3**
2,4-Dinitrotoluene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.21**
2,6-Dinitrotoluene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**3.7**
2-Chloronaphthalene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**6,200**
2-Chlorophenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**4.4**
2-Methylnaphthalene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**600**
2-Methylphenol(o-Cresol)	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**180**
2-Nitroaniline	mg/kg	ND (0.905)	ND (0.882)	ND (0.813)	ND (0.813)	ND (0.815)	ND (0.820)	ND (0.821)	ND (0.882)	ND (0.811)	ND (0.810)	ND (0.807)	ND (0.808)	ND (0.805)	ND (0.823)	ND (0.800)	ND (0.807)	**11**
2-Nitrophenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**29**
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.723)	ND (0.713)	ND (0.730)	MA (0.734)	ND (0.732)	ND (0.742)	ND (0.736)	ND (0.713)	ND (0.728)	ND (0.727)	ND (0.725)	ND (0.727)	ND (0.720)	ND (0.740)	ND (0.720)	ND (0.735)	**18**[7]
3,3'-Dichlorobenzidine	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**8.3**
3-Nitroaniline	mg/kg	ND (0.905)	ND (0.882)	ND (0.813)	ND (0.813)	ND (0.815)	ND (0.820)	ND (0.821)	ND (0.882)	ND (0.811)	ND (0.810)	ND (0.807)	ND (0.808)	ND (0.805)	ND (0.823)	ND (0.800)	ND (0.807)	**1.1**
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.905)	ND (0.882)	ND (0.813)	ND (0.813)	ND (0.815)	ND (0.820)	ND (0.821)	ND (0.882)	ND (0.811)	ND (0.810)	ND (0.807)	ND (0.808)	ND (0.805)	ND (0.823)	ND (0.800)	ND (0.807)	**0.37**
4-Bromophenylphenyl ether	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**NS**
4-Chloro-3-methylphenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**37**
4-Chloroaniline	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.42**
4-Chlorophenylphenyl ether	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**NS**
4-Nitroaniline	mg/kg	ND (0.905)	ND (0.882)	ND (0.813)	ND (0.813)	ND (0.815)	ND (0.820)	ND (0.821)	ND (0.882)	ND (0.811)	ND (0.810)	ND (0.807)	ND (0.808)	ND (0.805)	ND (0.823)	ND (0.800)	ND (0.807)	**3.3**
4-Nitrophenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**6**
Acenaphthene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**2,700**
Acenaphthylene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**2,500**
Anthracene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**350**
Benzo(a)anthracene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**5.7**
Benzo(a)pyrene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.57**
Benzo(b)fluoranthene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**5.7**
Benzo(g,h,i)perylene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**180**
Benzo(k)fluoranthene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**57**
Benzyl alcohol	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**1,800**
bis(2-Chloroethoxy)methane	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**11**
bis(2-Chloroethyl) ether	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.015**
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**30**
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**130**
Butylbenzylphthalate	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**3,000**
Chrysene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**230**
Dibenz(a,h)anthracene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.57**
Dibenzofuran	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**95**
Diethylphthalate	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**2900**
Dimethylphthalate	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**NS**
Di-n-butylphthalate	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**1500**
Di-n-octylphthalate	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**10000**
Fluoranthene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**3,200**
Fluorene	mg/kg	ND (0.382)	ND (0.357)	ND (0.356)	ND (0.367)	ND (0.368)	ND (0.371)	ND (0.368)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.363)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**3,000**

DIM0209034

DIM0209165

Table 4.8-1
Test Pit Sample Results for Soil
Gesford 2/7H NW Wellsite

Dimock Township
Susquehanna County, PA

Sample Location Sample Identification Sample Date Parameter	Units	*Gesford 2/7* G-7-P9B 5/26/2010	*Gesford 2/7* G-7-P10A 5/26/2010	*Gesford 2/7* G-7-P10B 5/26/2010	*Gesford 2/7* G-7-P11A 5/26/2010	*Gesford 2/7* G-7-P11B 5/26/2010	*Gesford 2/7* G-7-P11C 5/26/2010	*Gesford 2/7* G-7-P12A 5/26/2010	*Gesford 2/7* G-7-P12B 5/26/2010	*Gesford 2/7* G-7-P13A 5/26/2010	*Gesford 2/7* G-7-P13B 5/26/2010	*Gesford 2/7* G-7-P14A 5/26/2010	*Gesford 2/7* G-7-P14B 5/26/2010	*Gesford 2/7* G-7-P15A 5/26/2010	*Gesford 2/7* G-7-P15B 5/26/2010	*Gesford 2/7* G-7-P16A 5/26/2010	*Gesford 2/7* G-7-P16B 5/26/2010	SOIL Residential Used Aquifer MSCs[1]
SVOCs (8270)																		
Hexachloro-1,3-butadiene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**10**
Hexachlorobenzene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.96**
Hexachlorocyclopentadiene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**91**
Hexachloroethane	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.56**
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**6**
Isophorone	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**10**
Naphthalene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**25**
Nitrobenzene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**7.3**
N-Nitroso-di-n-propylamine	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**0.0094**
N-Nitrosodiphenylamine	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**20**
Pentachlorophenol	mg/kg	ND (0.905)	ND (0.846)	ND (0.918)	ND (0.916)	ND (0.918)	ND (0.878)	ND (0.914)	ND (0.846)	ND (0.911)	ND (0.910)	ND (0.907)	ND (0.909)	ND (0.905)	ND (0.876)	ND (0.900)	ND (0.907)	**5**
Phenanthrene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**10,000**
Phenol	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**200**
Pyrene	mg/kg	ND (0.382)	ND (0.357)	ND (0.388)	ND (0.387)	ND (0.388)	ND (0.371)	ND (0.386)	ND (0.357)	ND (0.384)	ND (0.384)	ND (0.383)	ND (0.383)	ND (0.382)	ND (0.370)	ND (0.380)	ND (0.382)	**2,200**

Notes:
All results in milligram per kilogram (mg/kg) unless c
[1] = Medium-Specific Concentrations (MSCs) were e
Appendix A, Table 3 and Table 4 of 25 PA Code
[2]= ND (0.10) = Parameter not detected at the detec
[3]=No Standard
[4]=as Chromium III.
[5]=as cis-1, 2 - Dichloroethlene
[6]=as Total xylenes.
[7]=as p-Cresol
23.5 =Result exceeds SHS Residential, Used

Table 4.12-1
Test Pit Analytical Results for Soil
Teel 6 Wellsite

Dimock Township, Susquehanna County, PA

Sample Loation **Sample Identification** Sample Date Parameter	Units	*Teel 6* TEEL-6-P1A 5/27/2010	*Teel 6* TEEL-6-P1B 5/27/2010	*Teel 6* TEEL-6-P1C 5/27/2010	*Teel 6* TEEL-6-P1D 5/27/2010	*Teel 6* TEEL-6-P2A 5/27/2010	*Teel 6* TEEL-6-P2B 5/27/2010	*Teel 6* TEEL-6-P2C 5/27/2010	*Teel 6* TEEL-6-P3A 5/27/2010	*Teel 6* TEEL-6-P3B 5/27/2010	*Teel 6* TEEL-6-P3C 5/27/2010	*Teel 6* TEEL-6-P4A 5/27/2010	*Teel 6* TEEL-6-P4B 5/27/2010	*Teel 6* TEEL-6-P4C 5/27/2010	SOIL Residential Used Aquifer MSCs[1]
General Chemistry Analyses															
Percent Moisture (ASTM D2974-87)	%	8.0	20.3	11.9	8.6	8.3	7.3	7.6	6.5	6.0	7.4	9.4	9.7	6.2	NS[3]
Ethylene Glycol (8015)	mg/kg	ND (10.0)[2]	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	1,400
Metals Analyses (6010B)															
Lead	mg/kg	119	98.9	95.6	106	35.9	39.5	99.8	122	127	125	442	190	211	450
VOCs (8260)															
Benzene	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	0.5
1,2-Dibromoethane (EDB)	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	0.005
1,2-Dichloroethane	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	0.5
Ethylbenzene	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	600
Methyl-tert-butyl ether	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	2
Naphthalene	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	25
Toluene	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	100
1,2,4-Trimethylbenzene	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	8.4
1,3,5-Trimethylbenzene	mg/kg	ND (0.0063)	ND (0.0060)	ND (0.0060)	ND (0.0058)	ND (0.0065)	ND (0.0024)	ND (0.0063)	ND (0.0050)	ND (0.0073)	ND (0.0069)	ND (0.0071)	ND (0.0073)	ND (0.0069)	2.3
Xylene (Total)	mg/kg	ND (0.0189)	ND (0.0241)	ND (0.0239)	ND (0.0173)	ND (0.0257)	ND (0.0073)	ND (0.0189)	ND (0.0151)	ND (0.0220)	ND (0.0208)	ND (0.0212)	ND (0.0227)	ND (0.0207)	1,000
SVOCs (8270-SIM)															
Anthracene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	350
Benzo(a)anthracene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	6
Benzo(a)pyrene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	0.6
Benzo(b)fluoranthene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	6
Benzo(g,h,i)perylene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	180
Chrysene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	230
Fluorene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	3,000
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	6
Phenanthrene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	10,000
Pyrene	mg/kg	ND (0.0071)	ND (0.0068)	ND (0.0075)	ND (0.0073)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0071)	ND (0.0072)	ND (0.0072)	ND (0.0069)	2200

Notes:
All results in milligram per kilogram (mg/kg) unless otherwise stated.
[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed in Appendix A, Table 3 and Table 4 of 25 PA Code Section 250, Administration of the Land Recycling Act (Act 2) regulations.
[2]= ND (0.0063) = Parameter not detected at the detection limit specified in parentheses.
[3]=No Standard
15.9 =Result exceeds SHS Residential, Used Aquifer MSC

Table 4.12-2
Analytical Results for Water
Teel 6 Wellsite

Dimock Township
Susquehanna County, PA

Sample Location **Sample Identification** *Sample Date* Parameter	Units	*Teel 6* **Teel-6-UP** **5/26/2010**	*Teel 6* **Teel-6-DN** **5/26/2010**	**Surface Water Quality Criteria[1]**		
				Fish and Aquatic Life Criteria - Chronic	**Fish and Aquatic Life Criteria - Acute**	**Human Health Criteria**
General Chemistry (8015)						
Ethylene Glycol	mg/L	ND (10.0)	ND (10.0)	**NS**	**NS**	**NS**
VOCs (8260)						
Benzene	ug/L	ND (1.0)[2]	ND (1.0)	**130**	**640**	**1.2**
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	**580**	**2,900**	**530**
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	**NS[3]**	**NS**	**NS**
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	**NS**	**NS**	**NS**
Naphthalene	ug/L	ND (2.0)	ND (2.0)	**43**	**140**	**NS**
Toluene	ug/L	ND (1.0)	ND (1.0)	**330**	**1,700**	**1,300**
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	**NS**	**NS**	**NS**
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	**NS**	**NS**	**NS**

Notes:
[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable.
[2]= ND (1.0) = Parameter not detected at the detection limit specified in parentheses.

Table 4.13-1
Borehole Analytical Results for Soil
Teel 7 Wellsite

Dimock, Township
Susquehana County, PA

Sample Location Sample Identification Sample Date Parameter	Units	*TEEL 7* TEEL-7-B1 5/25/2010	*TEEL 7* TEEL-7-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[2]
General Chemistry Analyses				
Percent Moisture (ASTM D2974-87)	%	7.4	10.5	NS[3]
Nitrogen, Ammonia (EPA 350.1)	mg/kg	12.1	ND (5.4)	1,900
Chloride (SM 4500-Cl-E)	mg/L	ND (3.0)[2]	ND (3.0)	NS
Surfactants (MBAS, SM 5540C)	mg/L	ND (0.10)	ND (0.10)	NS
Ethylene Glycol (8015)	mg/kg	ND (10.0)	ND (10.0)	1,400
Metals Analyses (6010B/7471)				
Aluminum	mg/kg	11,500	8,990	190,000
Antimony	mg/kg	ND (0.38)	ND (0.32)	27
Arsenic	mg/kg	7.8	11.8	12
Barium	mg/kg	85.9	79.2	8,200
Beryllium	mg/kg	0.58	0.4	320
Boron	mg/kg	6.7	5.4	1,900
Cadmium	mg/kg	0.37	0.25	38
Calcium	mg/kg	1,400	1,520	NS
Chromium	mg/kg	13.1	10.5	190,000[4]
Cobalt	mg/kg	10.8	9	50
Copper	mg/kg	11.9	17.2	8,100
Iron	mg/kg	23,600	19,200	150,000
Lead	mg/kg	5.6	6.8	450
Magnesium	mg/kg	4,260	3,450	NS
Manganese	mg/kg	995	919	2,000
Molybdenum	mg/kg	ND (1.5)	ND (1.3)	650
Nickel	mg/kg	20	15.7	650
Potassium	mg/kg	1,460	1,120	NS
Selenium	mg/kg	ND (0.38)	0.32	26
Silver	mg/kg	0.79	0.72	84
Sodium	mg/kg	ND (378)	ND (319)	NS
Thallium	mg/kg	ND (1.3)	ND (1.3)	14
Vanadium	mg/kg	12.9	10.4	1,500
Zinc	mg/kg	52.1	45.1	12,000
Mercury	mg/kg	ND (0.10)	ND (0.11)	10
VOC Analyses (8260)				
1,1,1-Trichloroethane	mg/kg	ND (0.0068)	ND (0.0047)	20
1,1,2,2-Tetrachloroethane	mg/kg	ND (0.0068)	ND (0.0047)	0.08
1,1,2-Trichloroethane	mg/kg	ND (0.0068)	ND (0.0047)	0.5
1,1-Dichloroethane	mg/kg	ND (0.0068)	ND (0.0047)	3.1
1,1-Dichloroethene	mg/kg	ND (0.0068)	ND (0.0047)	0.7
1,2,4-Trimethylbenzene	mg/kg	ND (0.0068)	ND (0.0047)	8.4
1,2-Dichlorobenzene	mg/kg	ND (0.0068)	ND (0.0047)	60
1,2-Dichloroethane	mg/kg	ND (0.0068)	ND (0.0047)	0.5
1,2-Dichloroethene (Total)	mg/kg	ND (0.0136)	ND (0.0093)	7[5]
1,2-Dichloropropane	mg/kg	ND (0.0068)	ND (0.0047)	0.5
1,3,5-Trimethylbenzene	mg/kg	ND (0.0068)	ND (0.0047)	2.3
1,3-Dichlorobenzene	mg/kg	ND (0.0068)	ND (0.0047)	61
1,4-Dichlorobenzene	mg/kg	ND (0.0068)	ND (0.0047)	10
2-Butanone (MEK)	mg/kg	ND (0.0136)	ND (0.0093)	400
2-Hexanone	mg/kg	ND (0.0136)	ND (0.0093)	1.1
4-Methyl-2-pentanone (MIBK)	mg/kg	ND (0.0136)	ND (0.0093)	290

Table 4.13-1
Borehole Analytical Results for Soil
Teel 7 Wellsite

Dimock, Township
Susquehana County, PA

Sample Location Sample Identification Sample Date Parameter	Units	*TEEL 7* TEEL-7-B1 5/25/2010	*TEEL 7* TEEL-7-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[2]
VOC Analyses (8260)				
Acetone	mg/kg	0.0356	0.0417	3,300
Benzene	mg/kg	ND (0.0068)	ND (0.0047)	0.5
Bromodichloromethane	mg/kg	ND (0.0068)	ND (0.0047)	8
Bromoform	mg/kg	ND (0.0068)	ND (0.0047)	8
Bromomethane	mg/kg	ND (0.0068)	ND (0.0047)	1
Carbon disulfide	mg/kg	ND (0.0068)	ND (0.0047)	150
Carbon tetrachloride	mg/kg	ND (0.0068)	ND (0.0047)	0.5
Chlorobenzene	mg/kg	ND (0.0068)	ND (0.0047)	10
Chloroethane	mg/kg	ND (0.0068)	ND (0.0047)	23
Chloroform	mg/kg	ND (0.0068)	ND (0.0047)	8
Chloromethane	mg/kg	ND (0.0068)	ND (0.0047)	3
cis-1,2-Dichloroethene	mg/kg	ND (0.0068)	ND (0.0047)	7
cis-1,3-Dichloropropene	mg/kg	ND (0.0068)	ND (0.0047)	0.66
Dibromochloromethane	mg/kg	ND (0.0068)	ND (0.0047)	8
Ethylbenzene	mg/kg	ND (0.0068)	ND (0.0047)	70
Isopropylbenzene (Cumene)	mg/kg	ND (0.0068)	ND (0.0047)	600
m&p-Xylene	mg/kg	ND (0.0136)	ND (0.0093)	1,000[6]
Methylene Chloride	mg/kg	ND (0.0068)	ND (0.0047)	0.5
Methyl-tert-butyl ether	mg/kg	ND (0.0068)	ND (0.0047)	2
Naphthalene	mg/kg	ND (0.0068)	ND (0.0047)	25
n-Butylbenzene	mg/kg	ND (0.0068)	ND (0.0047)	950
n-Propylbenzene	mg/kg	ND (0.0068)	ND (0.0047)	290
o-Xylene	mg/kg	ND (0.0068)	ND (0.0047)	1,000[6]
p-Isopropyltoluene	mg/kg	ND (0.0068)	ND (0.0047)	NS
sec-Butylbenzene	mg/kg	ND (0.0068)	ND (0.0047)	350
Styrene	mg/kg	ND (0.0068)	ND (0.0047)	24
Tetrachloroethene	mg/kg	ND (0.0068)	ND (0.0047)	0.5
Toluene	mg/kg	ND (0.0068)	ND (0.0047)	100
TOTAL BTEX	mg/kg	ND (0.0408)	ND (0.0280)	NS
trans-1,2-Dichloroethene	mg/kg	ND (0.0068)	ND (0.0047)	10
trans-1,3-Dichloropropene	mg/kg	ND (0.0068)	ND (0.0047)	0.66
Trichloroethene	mg/kg	ND (0.0068)	ND (0.0047)	0.5
Vinyl chloride	mg/kg	ND (0.0068)	ND (0.0047)	0.2
Xylene (Total)	mg/kg	ND (0.0204)	ND (0.0140)	1,000
SVOC Analyses (8270)				
1,2,4-Trichlorobenzene	mg/kg	ND (0.358)	ND (0.368)	27
1,2-Dichlorobenzene	mg/kg	ND (0.358)	ND (0.368)	60
1,3-Dichlorobenzene	mg/kg	ND (0.358)	ND (0.368)	61
1,4-Dichlorobenzene	mg/kg	ND (0.358)	ND (0.368)	10
2,4,5-Trichlorophenol	mg/kg	ND (0.897)	ND (0.920)	2,300
2,4,6-Trichlorophenol	mg/kg	ND (0.358)	ND (0.368)	11
2,4-Dichlorophenol	mg/kg	ND (0.358)	ND (0.368)	2
2,4-Dimethylphenol	mg/kg	ND (0.358)	ND (0.368)	73
2,4-Dinitrophenol	mg/kg	ND (0.897)	ND (0.920)	7.3
2,4-Dinitrotoluene	mg/kg	ND (0.358)	ND (0.368)	0.21
2,6-Dinitrotoluene	mg/kg	ND (0.358)	ND (0.368)	3.7
2-Chloronaphthalene	mg/kg	ND (0.358)	ND (0.368)	6,200
2-Chlorophenol	mg/kg	ND (0.358)	ND (0.368)	4.4
2-Methylnaphthalene	mg/kg	ND (0.358)	ND (0.368)	600
2-Methylphenol(o-Cresol)	mg/kg	ND (0.358)	ND (0.368)	180
2-Nitroaniline	mg/kg	ND (0.897)	ND (0.920)	11
2-Nitrophenol	mg/kg	ND (0.358)	ND (0.368)	29
3&4-Methylphenol(m&p Cresol)	mg/kg	ND (0.717)	ND (0.736)	18[7]
3,3'-Dichlorobenzidine	mg/kg	ND (0.358)	ND (0.368)	8.3

Table 4.13-1
Borehole Analytical Results for Soil
Teel 7 Wellsite

Dimock, Township
Susquehana County, PA

Sample Location Sample Identification Sample Date Parameter	Units	*TEEL 7* TEEL-7-B1 5/25/2010	*TEEL 7* TEEL-7-B2 5/25/2010	SOIL Residential Used Aquifer MSCs[2]
SVOC Analyses (8270)				
3-Nitroaniline	mg/kg	ND (0.897)	ND (0.920)	1.1
4,6-Dinitro-2-methylphenol	mg/kg	ND (0.897)	ND (0.920)	0.37
4-Bromophenylphenyl ether	mg/kg	ND (0.359)	ND (0.368)	NS
4-Chloro-3-methylphenol	mg/kg	ND (0.359)	ND (0.368)	37
4-Chloroaniline	mg/kg	ND (0.359)	ND (0.368)	0.42
4-Chlorophenylphenyl ether	mg/kg	ND (0.359)	ND (0.368)	NS
4-Nitroaniline	mg/kg	ND (0.897)	ND (0.920)	3.3
4-Nitrophenol	mg/kg	ND (0.359)	ND (0.368)	6
Acenaphthene	mg/kg	ND (0.359)	ND (0.368)	2,700
Acenaphthylene	mg/kg	ND (0.359)	ND (0.368)	2,500
Anthracene	mg/kg	ND (0.359)	ND (0.368)	350
Benzo(a)anthracene	mg/kg	ND (0.359)	ND (0.368)	5.7
Benzo(a)pyrene	mg/kg	ND (0.359)	ND (0.368)	0.57
Benzo(b)fluoranthene	mg/kg	ND (0.359)	ND (0.368)	5.7
Benzo(g,h,i)perylene	mg/kg	ND (0.359)	ND (0.368)	180
Benzo(k)fluoranthene	mg/kg	ND (0.359)	ND (0.368)	57
Benzyl alcohol	mg/kg	ND (0.359)	ND (0.368)	1,800
bis(2-Chloroethoxy)methane	mg/kg	ND (0.359)	ND (0.368)	11
bis(2-Chloroethyl) ether	mg/kg	ND (0.359)	ND (0.368)	0.015
bis(2-Chloroisopropyl) ether	mg/kg	ND (0.359)	ND (0.368)	30
bis(2-Ethylhexyl)phthalate	mg/kg	ND (0.359)	ND (0.368)	130
Butylbenzylphthalate	mg/kg	ND (0.359)	ND (0.368)	3,000
Chrysene	mg/kg	ND (0.359)	ND (0.368)	230
Dibenz(a,h)anthracene	mg/kg	ND (0.359)	ND (0.368)	0.57
Dibenzofuran	mg/kg	ND (0.359)	ND (0.368)	95
Diethylphthalate	mg/kg	ND (0.359)	ND (0.368)	2900
Dimethylphthalate	mg/kg	ND (0.359)	ND (0.368)	NS
Di-n-butylphthalate	mg/kg	ND (0.359)	ND (0.368)	1,500
Di-n-octylphthalate	mg/kg	ND (0.359)	ND (0.368)	8,800
Fluoranthene	mg/kg	ND (0.359)	ND (0.368)	3,200
Fluorene	mg/kg	ND (0.359)	ND (0.368)	3,000
Hexachloro-1,3-butadiene	mg/kg	ND (0.359)	ND (0.368)	10
Hexachlorobenzene	mg/kg	ND (0.359)	ND (0.368)	0.96
Hexachlorocyclopentadiene	mg/kg	ND (0.359)	ND (0.368)	91
Hexachloroethane	mg/kg	ND (0.359)	ND (0.368)	0.56
Indeno(1,2,3-cd)pyrene	mg/kg	ND (0.359)	ND (0.368)	5.7
Isophorone	mg/kg	ND (0.359)	ND (0.368)	10
Naphthalene	mg/kg	ND (0.359)	ND (0.368)	25
Nitrobenzene	mg/kg	ND (0.359)	ND (0.368)	7.3
N-Nitroso-di-n-propylamine	mg/kg	ND (0.359)	ND (0.368)	0.0094
N-Nitrosodiphenylamine	mg/kg	ND (0.359)	ND (0.368)	20
Pentachlorophenol	mg/kg	ND (0.897)	ND (0.920)	5
Phenanthrene	mg/kg	ND (0.359)	ND (0.368)	10,000
Phenol	mg/kg	ND (0.359)	ND (0.368)	200
Pyrene	mg/kg	ND (0.359)	ND (0.368)	2,200

Notes:

[2]= ND (3.0) = Parameter not detected at the detection limit specified in parentheses.

[1] = Medium-Specific Concentrations (MSCs) were established from the Residential, Used Aquifer with TDS < 2500 MSCs Soil to Groundwater Numeric Values listed In Appendix A, Table 3 and Table 4 of 25 PA Code Section 250 , Administration of the Land Recycling Act (Act 2) regulations.

[3]=No Standard

[4]=as Chromium III.

[5]=as cis-1, 2 - Dichloroethlene

Table 4.13-2
Analytical Results for Surface Water Samples
Teel 7 Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification *Sample Location* *Sample Date* Parameter	Units	TEEL #5 C *Upgradient* 12/9/2009	TEEL #7 A *Wetland* 12/9/2009	TEEL #7 B *Wetland* 12/9/2009	TEEL #7 C *Downgradient* 12/9/2009	Surface Water Quality Criteria[1] Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
General Chemistry								
pH (SM 4500-H+B)	pH units	7.2	6.6	4.9	7.2	6.0-9.0		NS
TPH (C06-C10) (GRO, EPA 8015B Mod)	ug/L	ND (200)[2]	ND (200)	ND (200)	ND (200)	NS[3]	NS	NS
Diesel Components (DRO, EPA 8015B Mod)	mg/L	ND (0.11)	ND (0.12)	ND (0.11)	ND (0.11)	NS	NS	NS
Total Petroleum Hydrocarbons (EPA 1664A)	mg/L	ND (4.8)	ND (4.9)	ND (5.1)	ND (4.8)	NS	NS	NS
Acidity (SM 2310B)	mg/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Alkalinity (SM 2320B)	mg/L	24.0	30.0	ND (10.0)	26.0	NS	NS	NS
Ammonia (EPA 350.1)	mg/L	ND (0.10)	0.19	ND (0.10)	ND (0.10)	NS	NS	NS
Total Dissolved Solids (SM 2540C)	mg/L	56.0	82.0	32.0	66.0	NS	NS	750
Chloride (SM 4500-Cl-E)	mg/L	12.7	12.7	14.7	13.5	NS	NS	250
Metals (6010/7470)								
Aluminum, Total	ug/L	357	40,400	5,180	185	NS	750	NS
Antimony, Total	ug/L	ND (5.0)[2]	ND (5.0)	ND (5.0)	ND (5.0)	220	1,100	5.6
Arsenic, Total	ug/L	ND (5.0)	34.4	10.7	ND (5.0)	150	340	10
Barium, Total	ug/L	35.6	792	241	33.1	4,100	21,000	2,400
Beryllium, Total	ug/L	ND (1.0)	2.0	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Total	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	ND (50.0)	1,600	8,100	3,100
Cadmium, Total	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Calcium, Total	ug/L	10,600	20,400	14,600	10,600	NS	NS	NS
Chromium, Total	ug/L	ND (5.0)	38.4	5.5	ND (5.0)	NS	NS	NS
Cobalt, Total	ug/L	ND (5.0)	29.2	6.2	ND (5.0)	19	95	NS
Copper, Total	ug/L	ND (5.0)	37.3	5.2	ND (5.0)	NS	NS	NS
Iron, Total	ug/L	633	89,600	47,700	370	1,500[4]	1,500[4]	NS[4]
Lead, Total	ug/L	ND (2.0)	62.5	13.5	ND (2.0)	NS	NS	NS
Magnesium, Total	ug/L	2,290	11,400	3,230	2,230	NS	NS	NS
Manganese, Total	ug/L	92.9	2,160	990	70.2	NS	NS	1,000
Molybdenum, Total	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Nickel, Total	ug/L	ND (10.0)	53.8	10.3	ND (10.0)	NS	NS	NS
Potassium, Total	ug/L	1,330	7,350	1,740	1,340	NS	NS	NS
Selenium, Total	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Silver, Total	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Sodium, Total	ug/L	6,440	5,680	8,080	6,700	NS	NS	NS
Thallium, Total	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	13	65	0.24
Vanadium, Total	ug/L	ND (5.0)	48.3	7.2	ND (5.0)	100	510	NS
Zinc, Total	ug/L	ND (10.0)	243	26.6	ND (10.0)	NS	NS	NS
Mercury, Total	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	NS	NS	NS
Metals (6010/7470)								
Aluminum, Dissolved	ug/L	ND (50.0)	ND (50.0)	243	ND (50.0)	NS	NS	NS
Antimony, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Arsenic, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Barium, Dissolved	ug/L	33.0	70.5	120	31.6	NS	NS	NS
Beryllium, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Boron, Dissolved	ug/L	ND (50.0)	ND (50.0)	ND (50.0)	ND (50.0)	NS	NS	NS
Cadmium, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	0.25	2.01	NS
Calcium, Dissolved	ug/L	10,300	12,200	3,880	10,500	NS	NS	NS
Chromium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	74.1	569.8	NS
Cobalt, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Copper, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	9.0	13	NS
Iron, Dissolved	ug/L	122	145	5,590	137	NS	NS	300
Lead, Dissolved	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	2.5	64.6	NS
Magnesium, Dissolved	ug/L	2,170	2,180	982	2,190	NS	NS	NS
Manganese, Dissolved	ug/L	41.7	721	483	50.1	NS	NS	NS
Molybdenum, Dissolved	ug/L	ND (10.0)	ND (10.0)	16.6	ND (10.0)	NS	NS	NS
Nickel, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	52	470	610
Potassium, Dissolved	ug/L	1,230	2,990	858	1,310	NS	NS	NS
Selenium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	4.6	NS	NS
Silver, Dissolved	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	3.2	NS
Sodium, Dissolved	ug/L	6,510	4,870	3,220	6,660	NS	NS	NS
Thallium, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	NS	NS	NS
Vanadium, Dissolved	ug/L	ND (5.0)	ND (5.0)	ND (5.0)	ND (5.0)	NS	NS	NS
Zinc, Dissolved	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	120	120	NS
Mercury, Dissolved	ug/L	ND (0.20)	ND (0.20)	ND (0.20)	ND (0.20)	0.77	1.4	0.05

Table 4.13-2
Analytical Results for Surface Water Samples
Teel 7 Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification *Sample Location* *Sample Date* Parameter	Units	TEEL #5 C *Upgradient* 12/9/2009	TEEL #7 A *Wetland* 12/9/2009	TEEL #7 B *Wetland* 12/9/2009	TEEL #7 C *Downgradient* 12/9/2009	Surface Water Quality Criteria[1] Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
VOCs (8260)								
1,1,1-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	610	3,000	NS
1,1,2,2-Tetrachloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	210	1,000	0.17
1,1,2-Trichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	680	3,400	0.59
1,1-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,1-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1,500	7,500	33
1,2,4-Trichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	26	130	35
1,2,4-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,2-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	160	820	420
1,2-Dichloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	31,00	15,000	0.38
1,2-Dichloroethene (Total)	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	NS	NS	NS
1,2-Dichloropropane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2,200	11,000	NS
1,3,5-Trimethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
1,3-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	150	730	420
2-Butanone (MEK)	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	32,000	230,000	21,000
2-Hexanone	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	4,300	21,000	NS
4-Methyl-2-pentanone (MIBK)	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	5,000	26,000	NS
Acetone	ug/L	ND (10.0)	ND (10.0)	ND (10.0)	ND (10.0)	86,000	450,000	3,500
Benzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	130	640	1.2
Bromochloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Bromodichloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.55
Bromoform	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	370	1800	4.3
Bromomethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	110	550	47
Carbon disulfide	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Carbon tetrachloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	560	2800	0.23
Chlorobenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	240	1200	130
Chloroethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Chloroform	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	390	1,900	5.7
Chloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	5,500	28,000	NS
cis-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
cis-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	61	310	0.34
Dibromochloromethane	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.4
Ethylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	580	2,900	530
Isopropylbenzene (Cumene)	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
m&p-Xylene	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	210[5]	1,100[5]	70,000[5]
Methylene Chloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	2,400	12,000	4.6
Methyl-tert-butyl ether	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Naphthalene	ug/L	ND (2.0)	ND (2.0)	ND (2.0)	ND (2.0)	43	140	NS
n-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
n-Propylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
o-Xylene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	210[5]	1,100[5]	70,000[5]
p-Isopropyltoluene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
sec-Butylbenzene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Styrene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	NS
Tetrachloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	140	700	0.69
Toluene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	330	1,700	1,300
trans-1,2-Dichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	1,400	6,800	140
trans-1,3-Dichloropropene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	61	310	0.34
Trichloroethene	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	450	2,300	2.5
Vinyl Chloride	ug/L	ND (1.0)	ND (1.0)	ND (1.0)	ND (1.0)	NS	NS	0.025
Xylene (Total)	ug/L	ND (3.0)	ND (3.0)	ND (3.0)	ND (3.0)	210	1,100	70,000

Table 4.13-2
Analytical Results for Surface Water Samples
Teel 7 Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification *Sample Location* *Sample Date* Parameter	Units	TEEL #5 C *Upgradient* 12/9/2009	TEEL #7 A *Wetland* 12/9/2009	TEEL #7 B *Wetland* 12/9/2009	TEEL #7 C *Downgradient* 12/9/2009	Surface Water Quality Criteria[1] Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs (8270C)								
1,2,4-Trichlorobenzene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	26	130	35
1,2-Dichlorobenzene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	160	820	420
1,3-Dichlorobenzene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	69	350	420
1,4-Dichlorobenzene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	150	730	420
1-Methylnaphthalene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
2,4,5-Trichlorophenol	ug/L	ND (2.7)	ND (3.1)	ND (2.7)	ND (2.8)	NS	NS	NS
2,4,6-Trichlorophenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	91	460	1.4
2,4-Dichlorophenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	340	1,700	77
2,4-Dimethylphenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	130	660	380
2,4-Dinitrophenol	ug/L	ND (2.7)	ND (3.1)	ND (2.7)	ND (2.8)	320	1,600	0.05
2,4-Dinitrotoluene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	130	660	69
2,6-Dinitrotoluene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	200	990	0.05
2-Chloronaphthalene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	1,000
2-Chlorophenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
2-Methylnaphthalene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
2-Methylphenol(o-Cresol)	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
2-Nitroaniline	ug/L	ND (2.7)	ND (3.1)	ND (2.7)	ND (2.8)	NS	NS	NS
2-Nitrophenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	1,600	8,000	NS
3&4-Methylphenol(m&p Cresol)	ug/L	ND (2.2)	ND (2.5)	ND (2.2)	ND (2.2)	NS	NS	NS
3,3'-Dichlorobenzidine	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
3-Nitroaniline	ug/L	ND (2.7)	ND (3.1)	ND (2.7)	ND (2.8)	NS	NS	NS
4,6-Dinitro-2-methylphenol	ug/L	ND (2.7)	ND (3.1)	ND (2.7)	ND (2.8)	16	80	13
4-Bromophenylphenyl ether	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	54	270	NS
4-Chloro-3-methylphenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chloroaniline	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
4-Chlorophenylphenyl ether	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
4-Nitroaniline	ug/L	ND (2.7)	ND (3.1)	ND (2.7)	ND (2.8)	NS	NS	NS
4-Nitrophenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	470	2,300	NS
Acenaphthene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	17	83	670
Acenaphthylene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
Anthracene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	8,300
Azobenzene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(a)anthracene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	0.1	0.5	0.0038
Benzo(a)pyrene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(b)fluoranthene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzo(g,h,i)perylene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
Benzo(k)fluoranthene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Benzoic acid	ug/L	ND (13.0)	ND (12.3)	ND (13.0)	ND (13.8)	NS	NS	NS
Benzyl alcohol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
bis(2-Chloroethoxy)methane	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
bis(2-Chloroethyl) ether	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	6,000	30,000	0.03
bis(2-Chloroisopropyl) ether	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	1,400
bis(2-Ethylhexyl)phthalate	ug/L	ND (1.1)	1.2	ND (1.1)	ND (1.1)	910	4,500	1.2
Butylbenzylphthalate	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	35	140	150
Carbazole	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
Chrysene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenz(a,h)anthracene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Dibenzofuran	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
Diethylphthalate	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	800	4,000	17,000
Dimethylphthalate	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
Di-n-butylphthalate	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	21	110	2,000
Di-n-octylphthalate	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	NS
Fluoranthene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	40	200	130
Fluorene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	1,100

Table 4.13-2
Analytical Results for Surface Water Samples
Teel 7 Wellsite

Dimock Township, Susquehanna County, PA

Sample Identification Sample Location Sample Date Parameter	Units	TEEL #5 C Upgradient 12/9/2009	TEEL #7 A Wetland 12/9/2009	TEEL #7 B Wetland 12/9/2009	TEEL #7 C Downgradient 12/9/2009	Surface Water Quality Criteria[1]		
						Fish and Aquatic Life Criteria - Chronic	Fish and Aquatic Life Criteria - Acute	Human Health Criteria
SVOCs (8270C)								
Hexachloro-1,3-butadiene	ug/L	ND (1.0)	ND (1.2)	ND (1.1)	ND (1.1)	2	10	0.44
Hexachlorobenzene	ug/L	ND (1.1)	ND (1.2)	ND (1.2)	ND (1.2)	NS	NS	0.00028
Hexachlorocyclopentadiene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	1	5	40
Hexachloroethane	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	12	60	1.4
Indeno(1,2,3-cd)pyrene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	0.0038
Isophorone	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	2,100	10,000	35
Naphthalene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	43	140	NS
Nitrobenzene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	810	4000	17
N-Nitrosodimethylamine	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	3,400	17,000	0.00069
N-Nitroso-di-n-propylamine	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	0.005
N-Nitrosodiphenylamine	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	59	3,000	3.3
Pentachlorophenol	ug/L	ND (2.7)	ND (2.9)	ND (2.7)	ND (2.8)	0.00589	0.00768	0.27
Phenanthrene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	1	5	NS
Phenol	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	21,000
Pyrene	ug/L	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.1)	NS	NS	830

Notes:

[1]= Values from 25 Pa Code Chapter 93.8, Table 5; values assume a pH of 6.5 SU and hardness of 100 mg/L, where applicable. Values provided for chromium are for chromium III. Values for chloride, TDS, pH, manganese and iron from 25 Pa Code Chapter 93.7, Table 3.

[2]= ND (1.0) = Parameter not detected at the detection limit specified in parentheses.

[3]= No Standard.

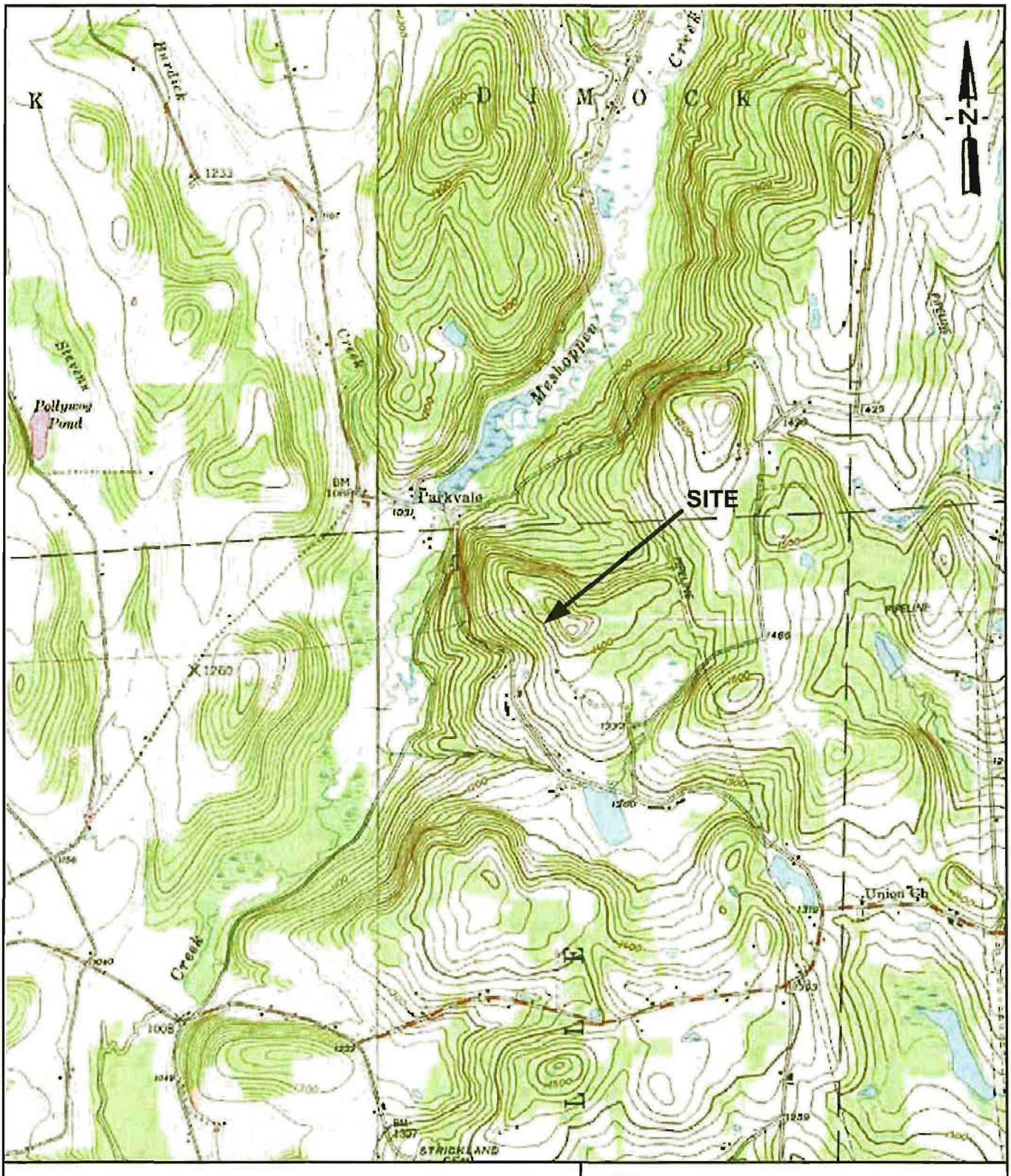
[4]= The specific water quality criteria for total recoverable iron is for aquatic life uses and is expressed as a 30-day average concentration. The water quality criteria for human health is expressed as dissolved iron. See 25 PA Code Section 93.7.

[5]= As total xylenes.

[6]= As total xylenes.

721 = Results exceed SHS R-U MSC and/or applicable surface water quality criteria.

FIGURES

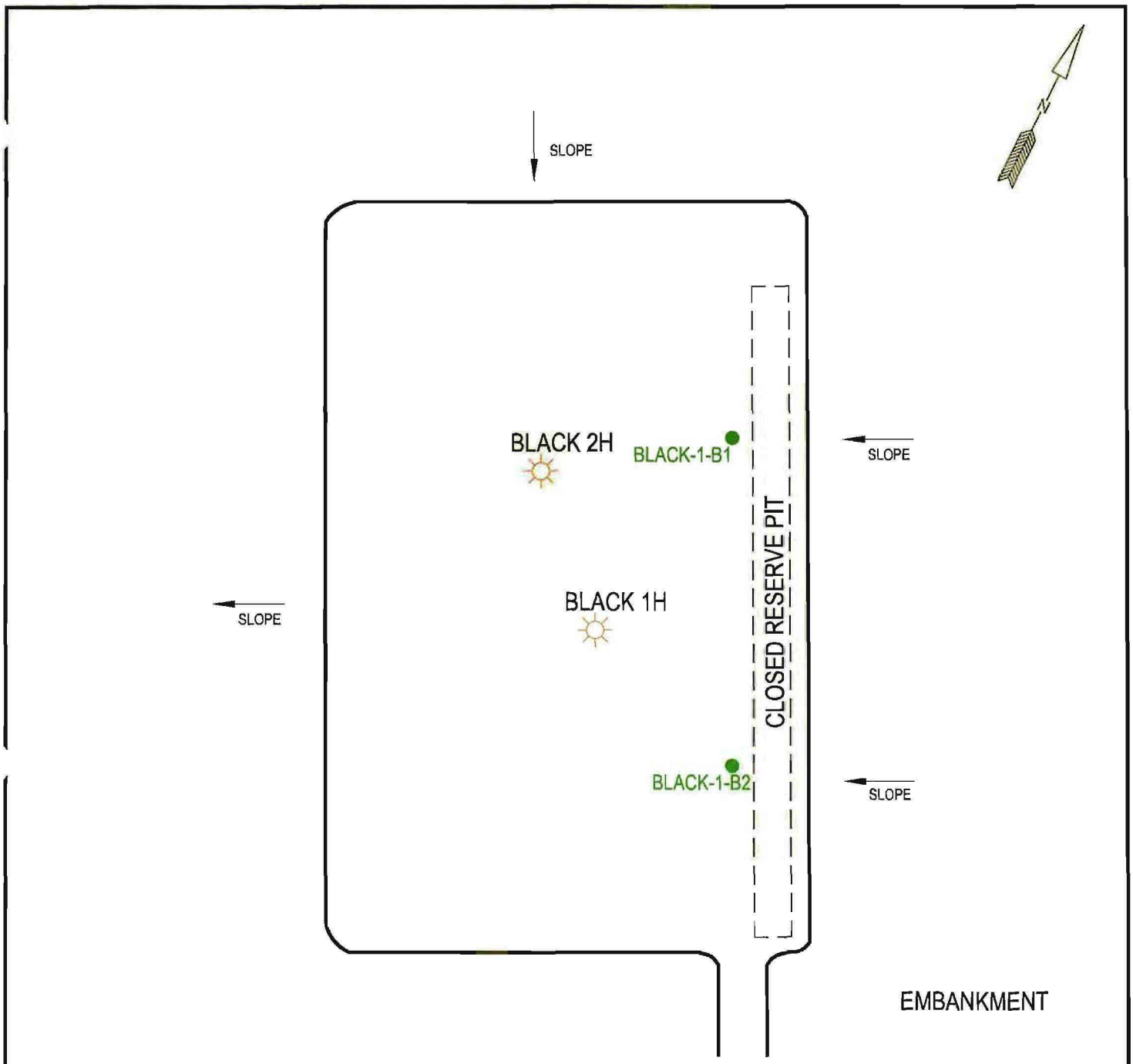


BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.1-1
SITE VICINITY MAP
BLACK 1H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS



APPROXIMATE HORIZONTAL SCALE

0 40 80 FEET

LEGEND

BLACK-1-B1 SOIL TEST BOREHOLE LOCATIONS (2)

Cabot Oil & Gas Corporation

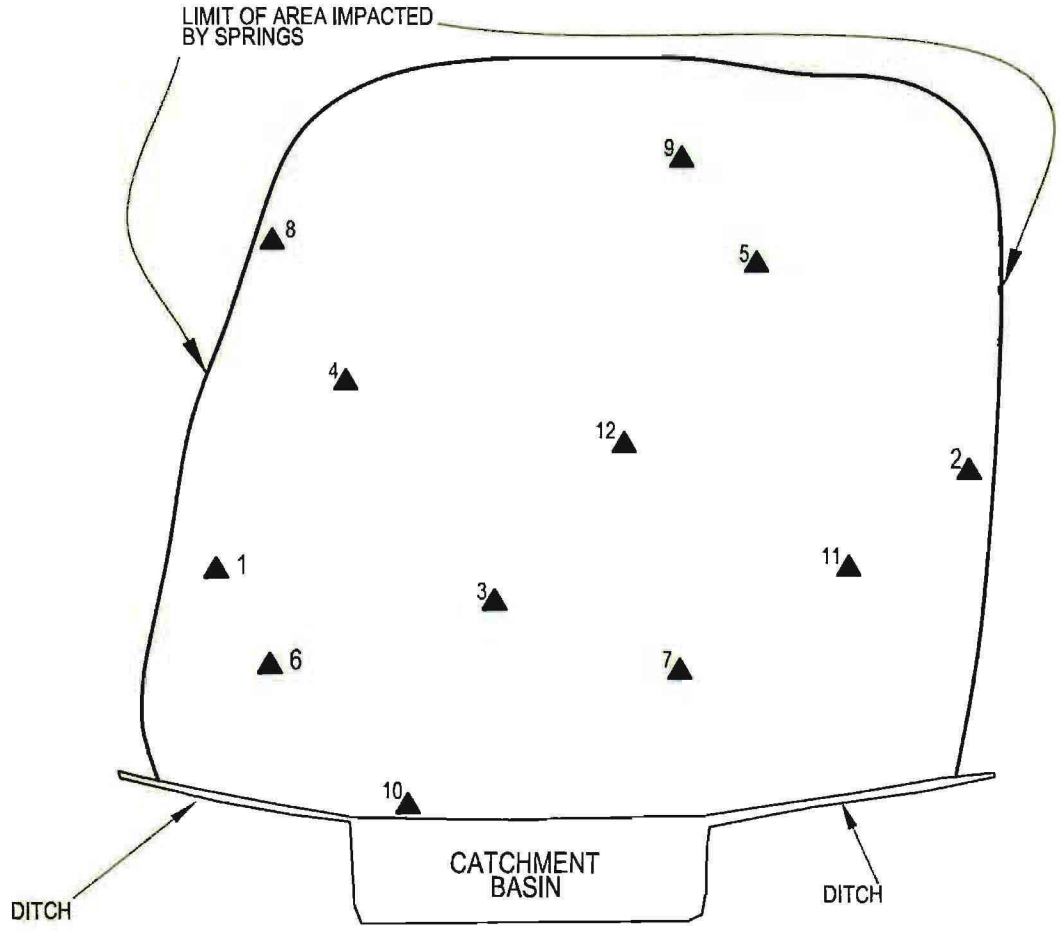
BLACK 1H/2H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY, PA

SOIL SAMPLING LOCATIONS BLACK 1H/2H WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.1-2

FILE:	DRAWN:	CHECKED:	APPROVED:	DATE:
BLACK.DWG	SLA			12/5/2011



APPROXIMATE HORIZONTAL SCALE

0 40 80 FEET

LEGEND

1 ▲ SOIL SAMPLING LOCATIONS ("BLACK 1H" HAS BEEN LEFT OFF SAMPLE NAME FOR CLARITY)

Cabot Oil & Gas Corporation

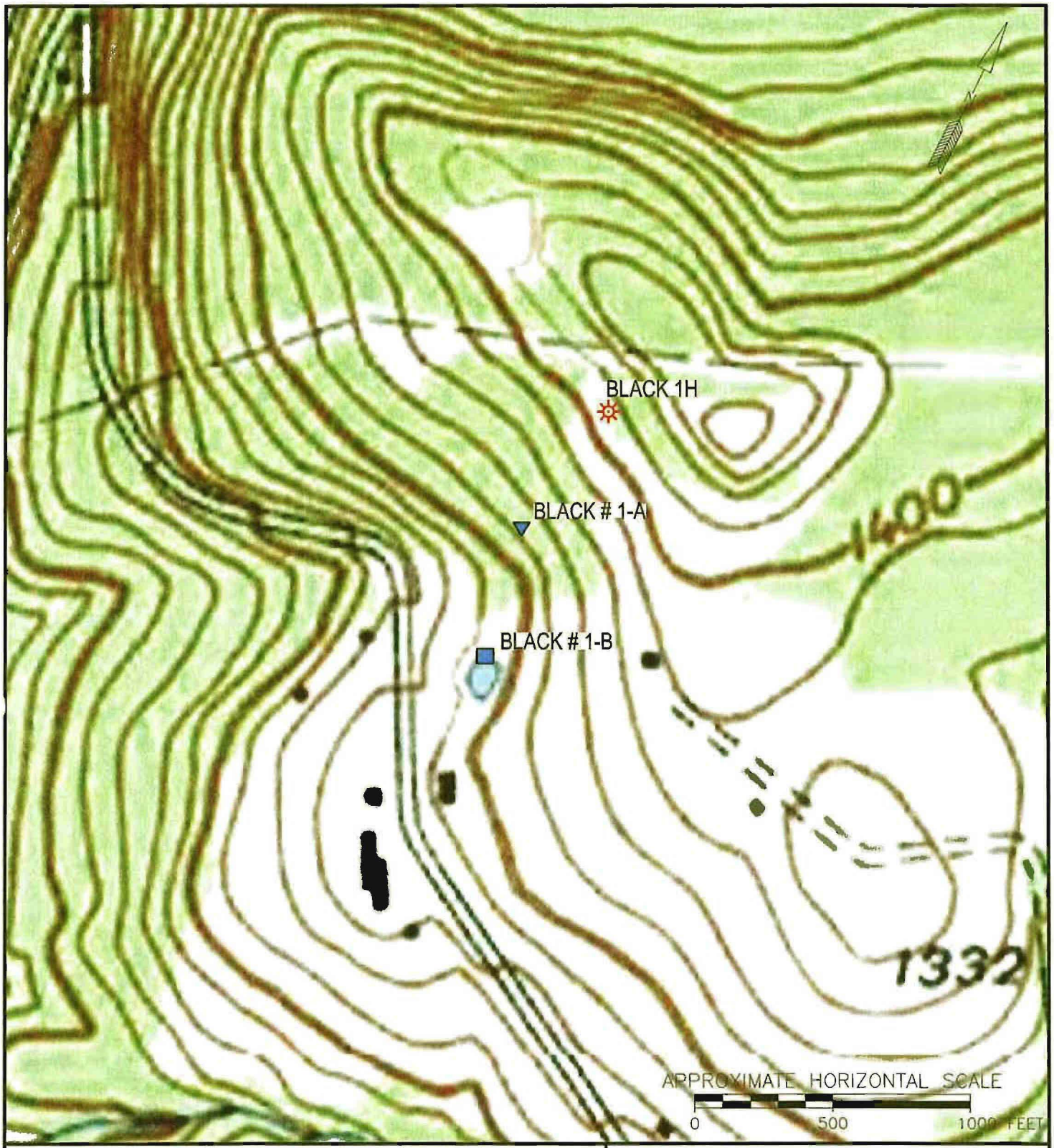
BLACK 1H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY, PA

SOIL SAMPLING LOCATIONS
BLACK 1H WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.1-3

FILE:	DRAWN:	CHECKED:	APPROVED:	DATE:
BLACK.DWG	SLA			12/1/2011



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATION
- SIDE GRADIENT/OTHER SURFACE WATER SAMPLING LOCATION

Cabot Oil & Gas Corporation

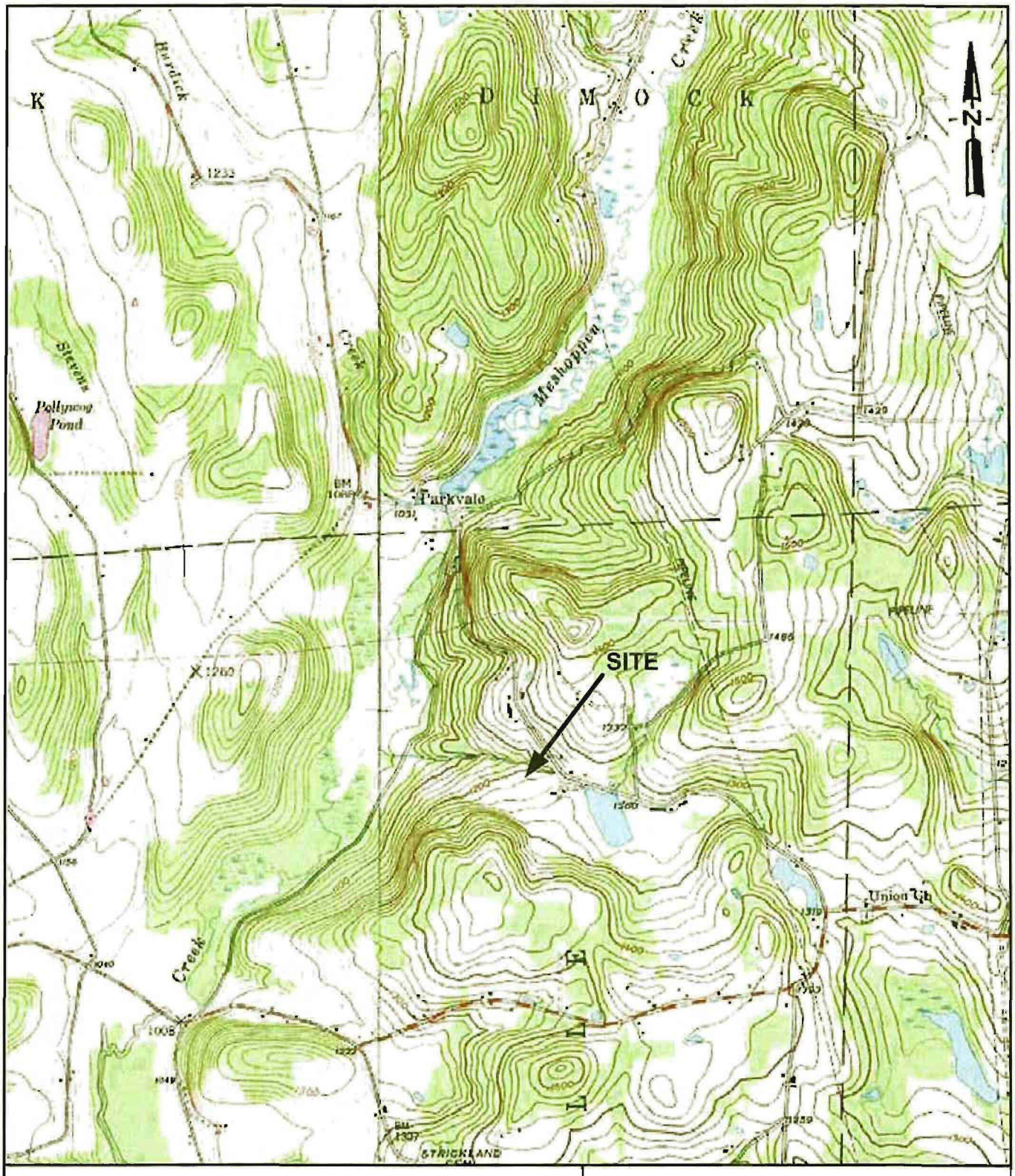
BLACK 1H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY, PA

SURFACE WATER SAMPLING LOCATIONS
BLACK 1H WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.1-4

FILE	DRAWN	CHECKED	APPROVED	DATE
BLACK.DWG	SLA			11/30/2011

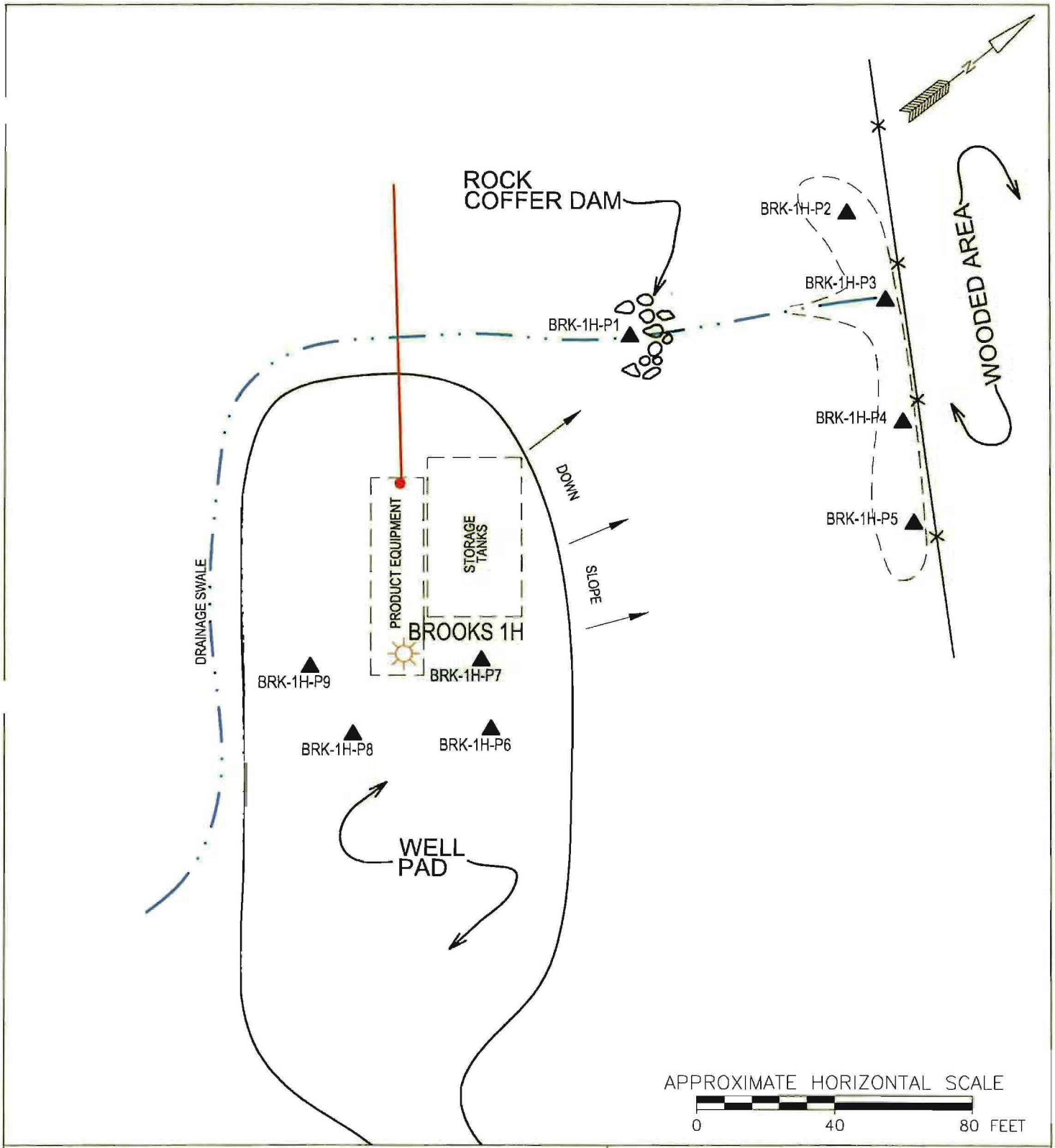


BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.2-1
SITE VICINITY MAP
BROOKS 1H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS



LEGEND

PIPELINE

BRK-1H-P1 SOIL TEST PIT SAMPLE LOCATIONS (9)

Cabot Oil & Gas Corporation

BROOKS 1H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY, PA

SOIL SAMPLING LOCATIONS
BROOKS 1H WELLSITE

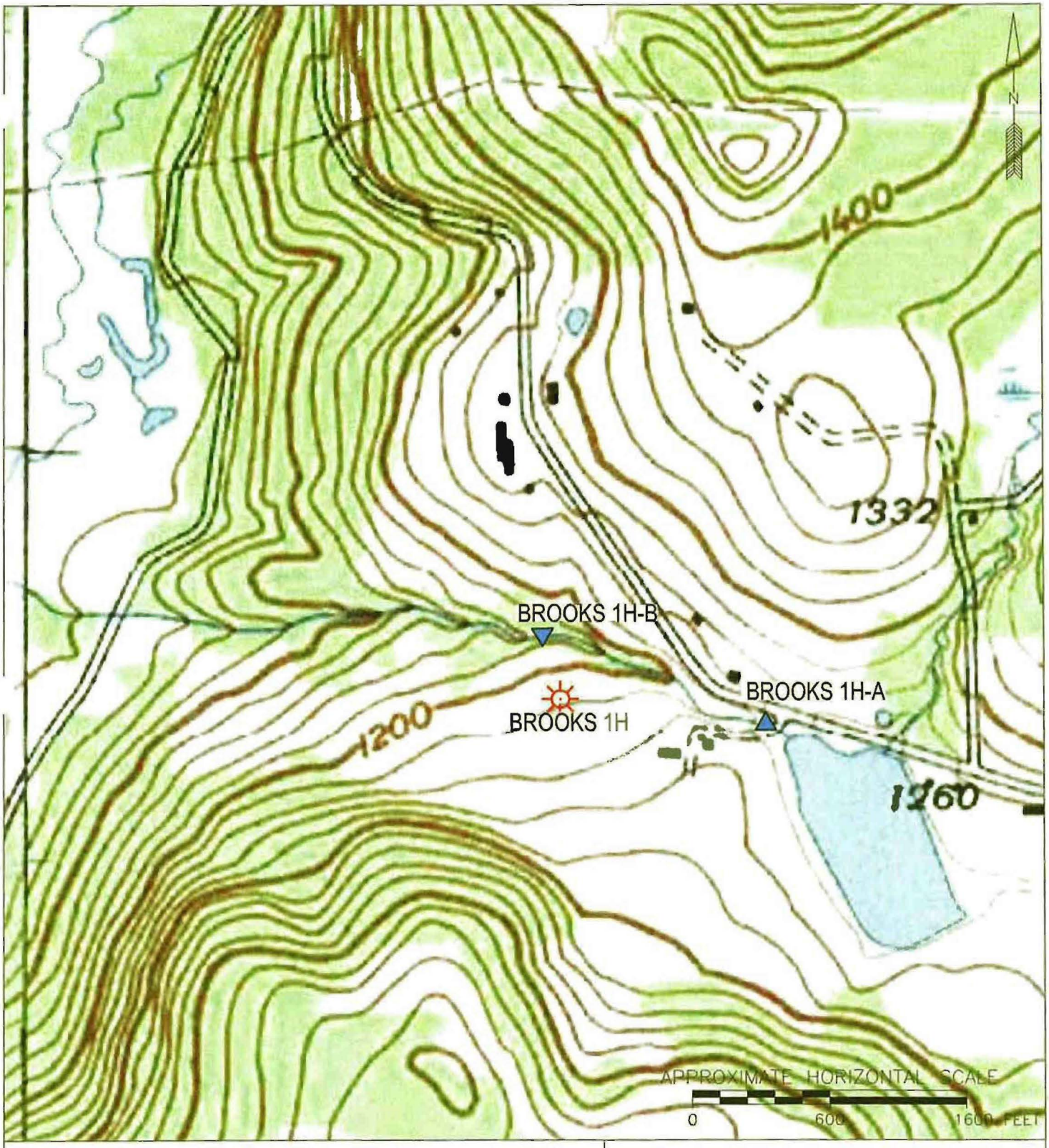
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE
4.2-2

FILE: DRAWN: CHECKED: APPROVED: DATE:

DIM0209034

DIM0209182



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

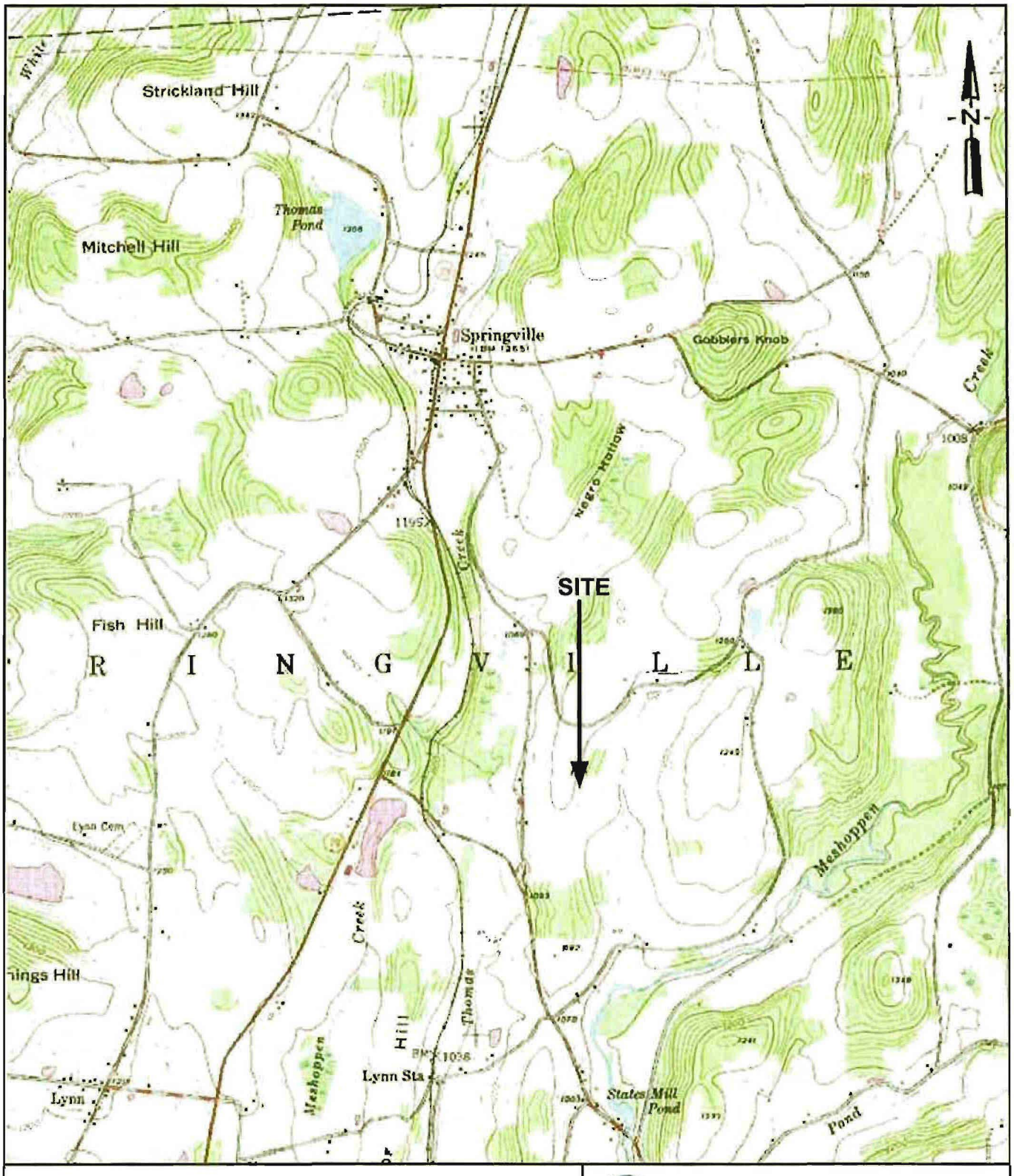
BROOKS 1H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY, PA

SURFACE WATER SAMPLING LOCATIONS BROOKS 1H WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

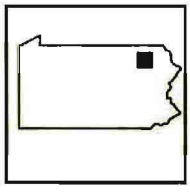
FIGURE
4.2-3

FILE: Brooks1H | DRAWN: CLA | CHECKED: | APPROVED: | DATE: 12/1/2011



0 2000 4000

APPROXIMATE SCALE IN FEET

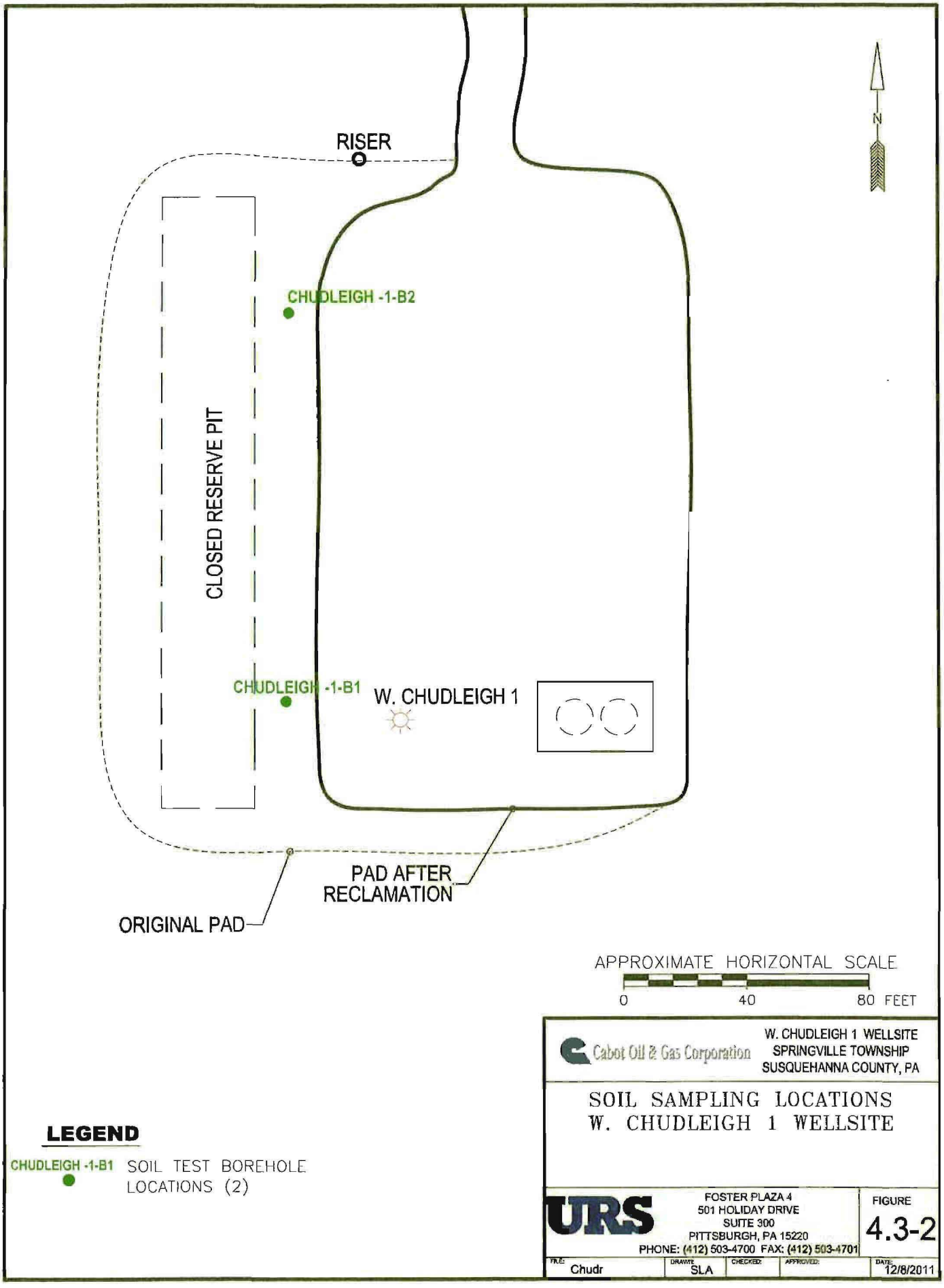


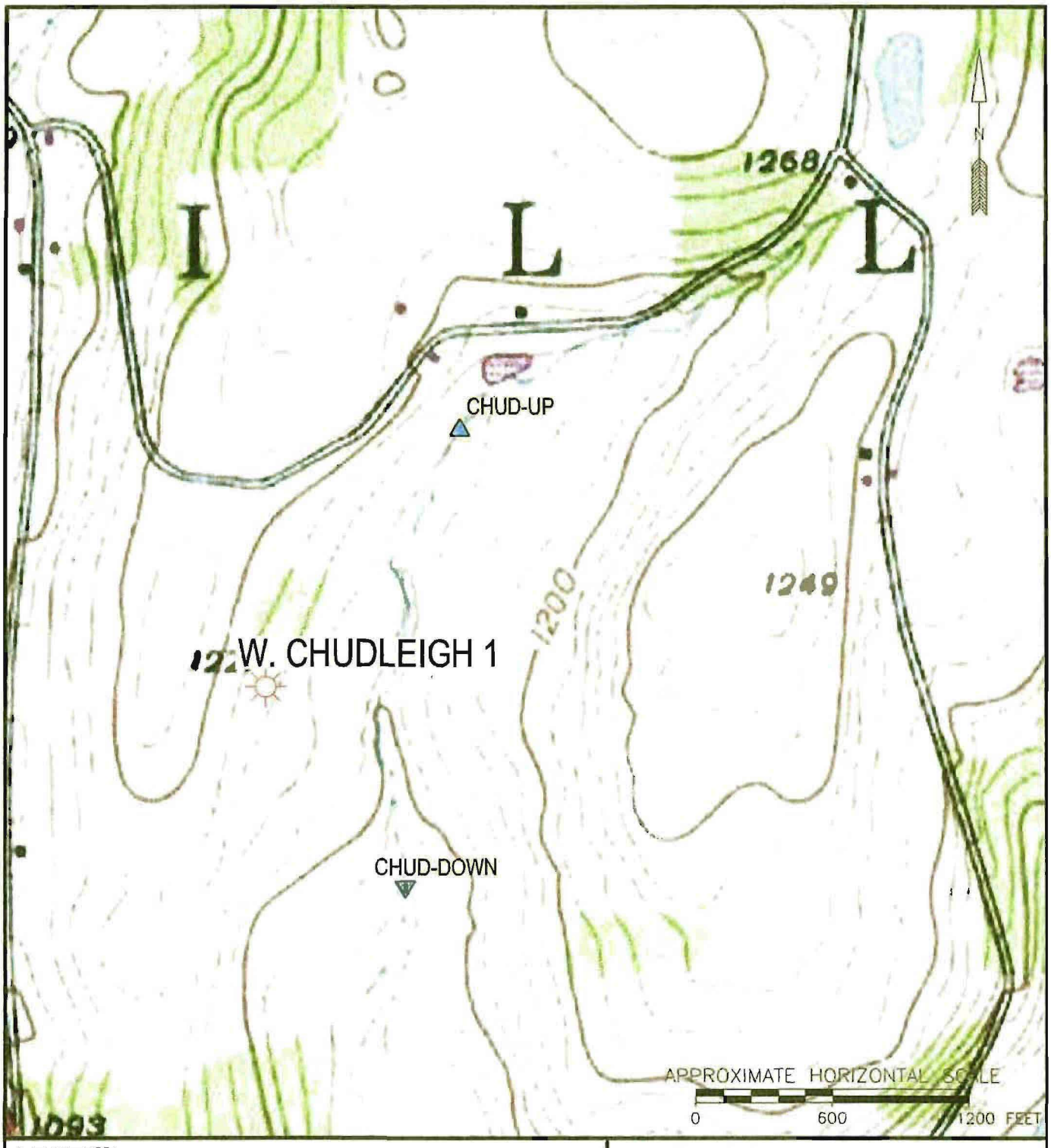
BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.3-1
SITE VICINITY MAP
CHUDLEIGH 1H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS


N
RISER
CHUDLEIGH -1-B2
CLOSED RESERVE PIT
CHUDLEIGH -1-B1
W. CHUDLEIGH 1
PAD AFTER RECLAMATION
ORIGINAL PAD
APPROXIMATE HORIZONTAL SCALE
0
40
80 FEET
LEGEND
CHUDLEIGH -1-B1 SOIL TEST BOREHOLE LOCATIONS (2)
Cabot Oil & Gas Corporation
W. CHUDLEIGH 1 WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY, PA
SOIL SAMPLING LOCATIONS
W. CHUDLEIGH 1 WELLSITE
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701
FIGURE
4.3-2
TRE: Chudr
DRAWN: SLA
CHECKED:
APPROVED:
DATE: 12/8/2011



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

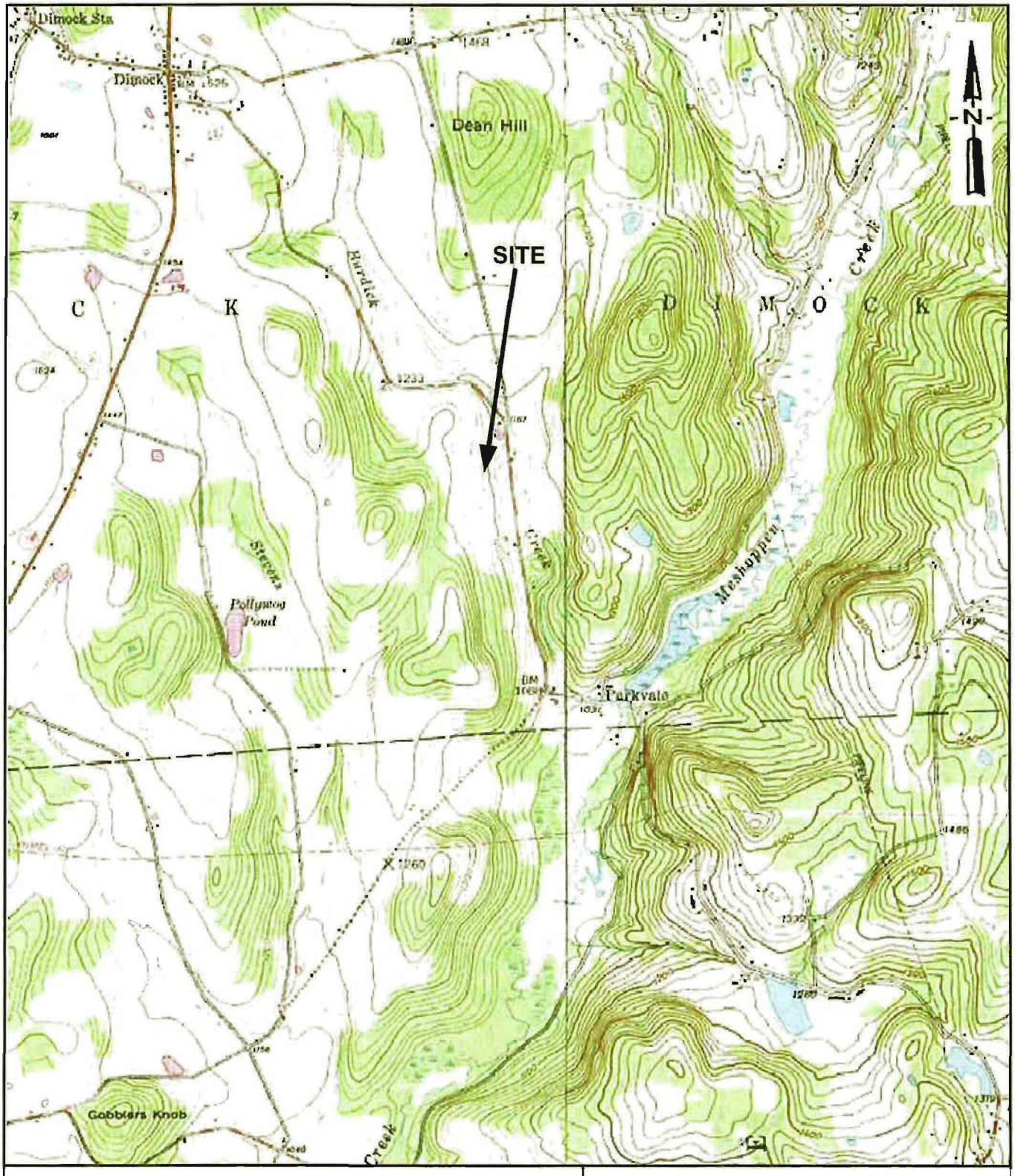
W. CHUDLEIGH 1 WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY, PA

SURFACE WATER SAMPLING LOCATIONS W. CHUDLEIGH 1 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.3-3

FILE	DRAWN	CHECKED	APPROVED	DATE
Chudr	SLA			12/8/2011



0 2000 4000

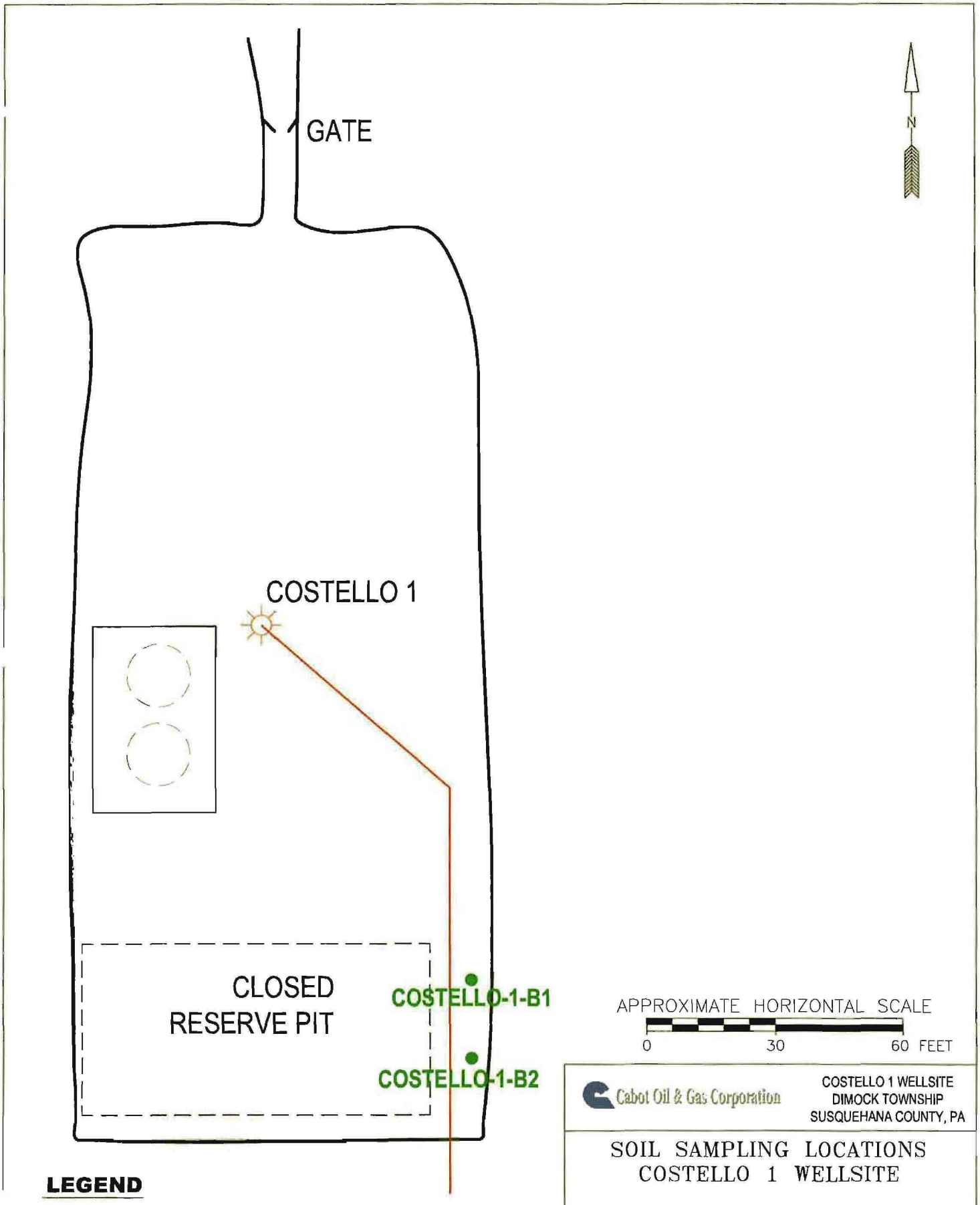
APPROXIMATE SCALE IN FEET

BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.4-1
SITE VICINITY MAP
COSTELLO 1 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS



Cabot Oil & Gas Corporation

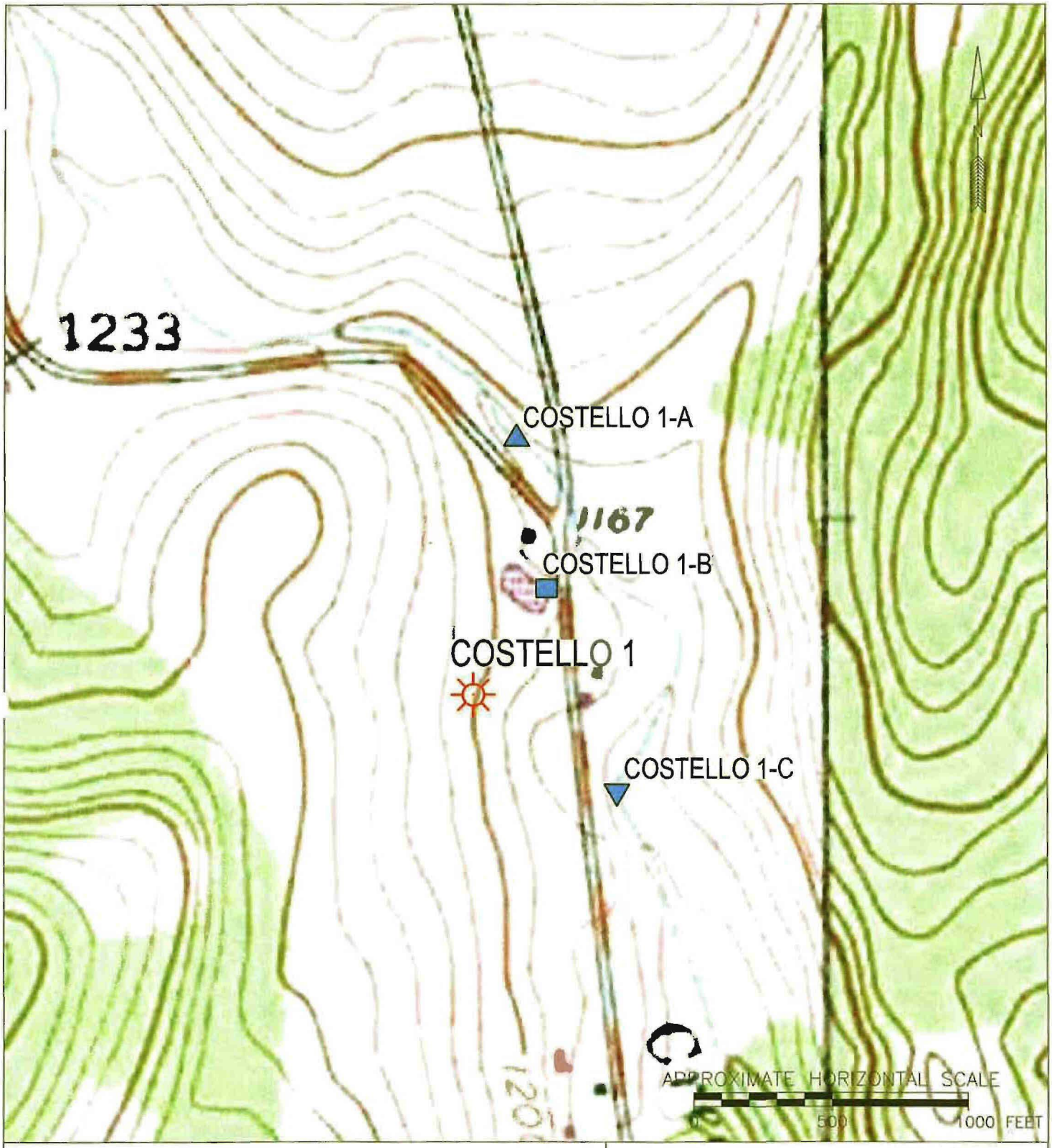
COSTELLO 1 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANA COUNTY, PA

SOIL SAMPLING LOCATIONS
COSTELLO 1 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE
4.4-2

FILE:	DRAWN:	CHECKED:	APPROVED:	DATE:
Costello	SLA			12/1/2011



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS
- SIDE GRADIENT/OTHER SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

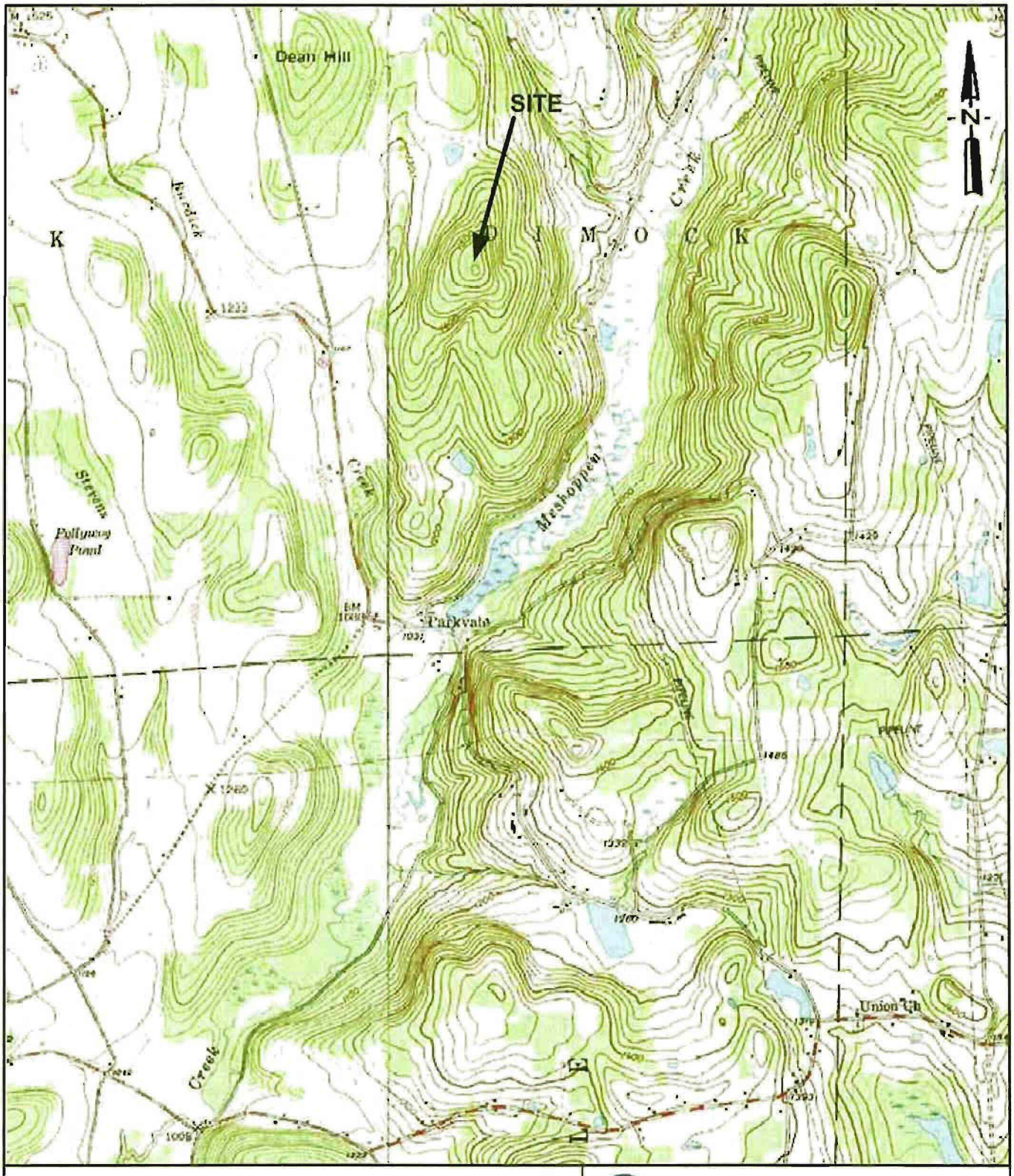
COSTELLO 1 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANA COUNTY, PA

SURFACE WATER SAMPLING LOCATIONS COSTELLO 1 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.4-3

FILE:	DRAWN:	CHECKED:	APPROVED:	DATE:
Costello	SLA			12/1/2011



0 2000 4000

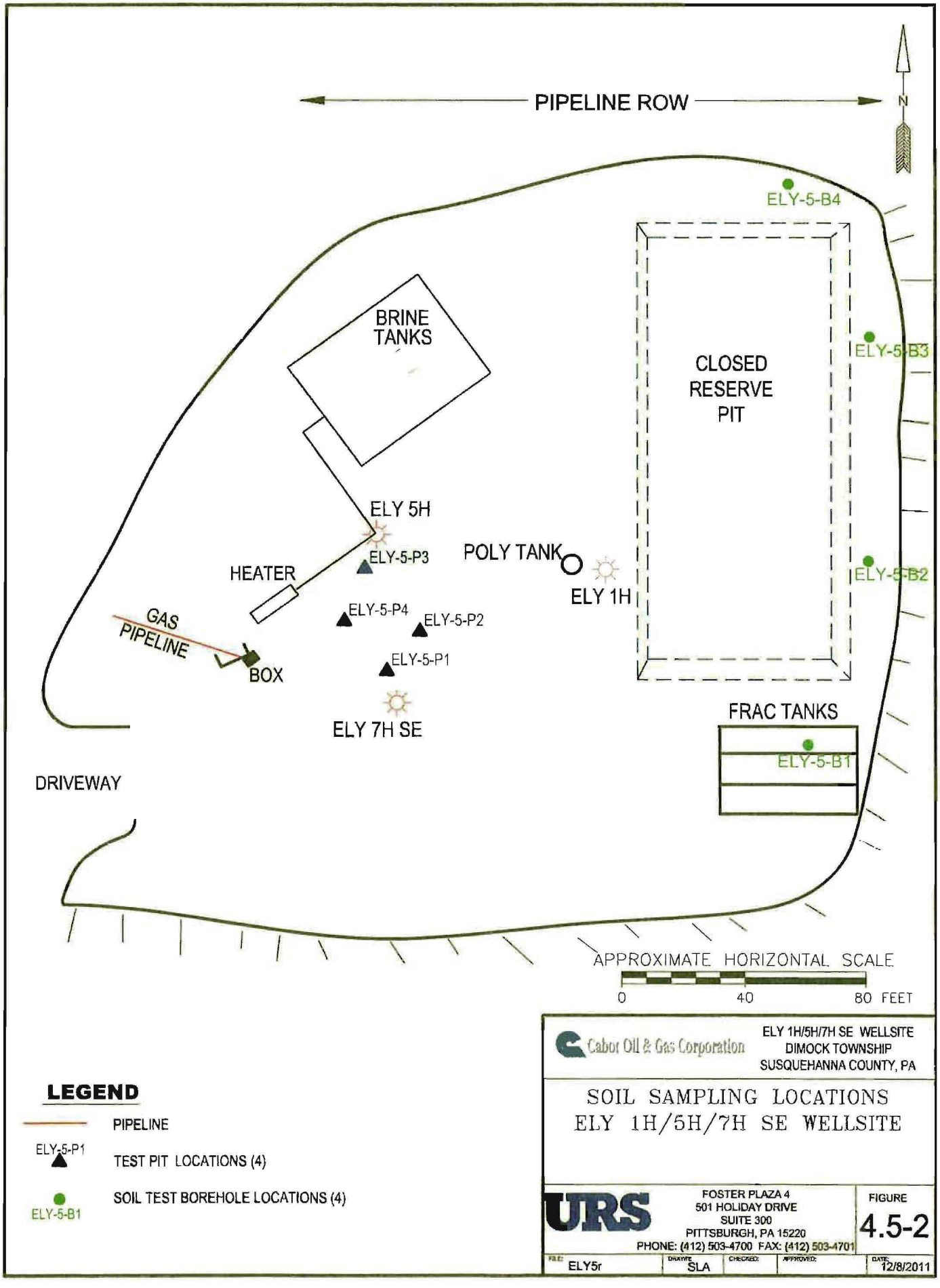
APPROXIMATE SCALE IN FEET

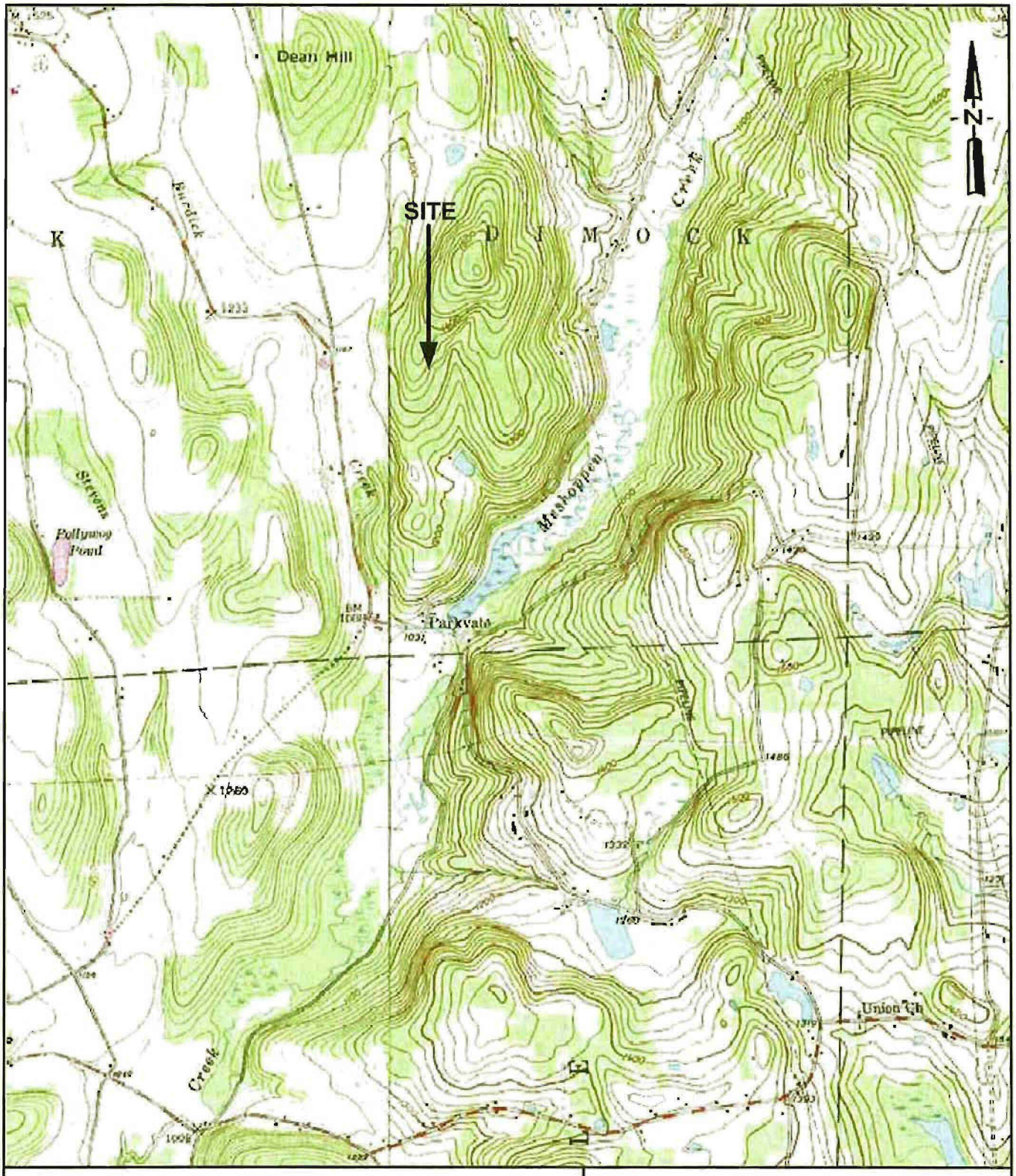
Cabot Oil & Gas Corporation

FIGURE 4.5-1
SITE VICINITY MAP
ELY 1H/5H/7H WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

URS


PIPELINE ROW
N
ELY-5-B4
BRINE TANKS
CLOSED RESERVE PIT
ELY-5-B3
ELY 5H
ELY-5-P3
HEATER
POLY TANK
ELY 1H
ELY-5-B2
GAS PIPELINE
ELY-5-P4
ELY-5-P2
BOX
ELY-5-P1
ELY 7H SE
FRAC TANKS
ELY-5-B1
DRIVEWAY
APPROXIMATE HORIZONTAL SCALE
0
40
80 FEET
LEGEND
PIPELINE
ELY-5-P1
TEST PIT LOCATIONS (4)
ELY-5-B1
SOIL TEST BOREHOLE LOCATIONS (4)
Cabot Oil & Gas Corporation
ELY 1H/5H/7H SE WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY, PA
SOIL SAMPLING LOCATIONS
ELY 1H/5H/7H SE WELLSITE
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701
FIGURE
4.5-2
FILE: ELY5r
DRAWN: SLA
CHECKED:
APPROVED:
DATE: 12/8/2011

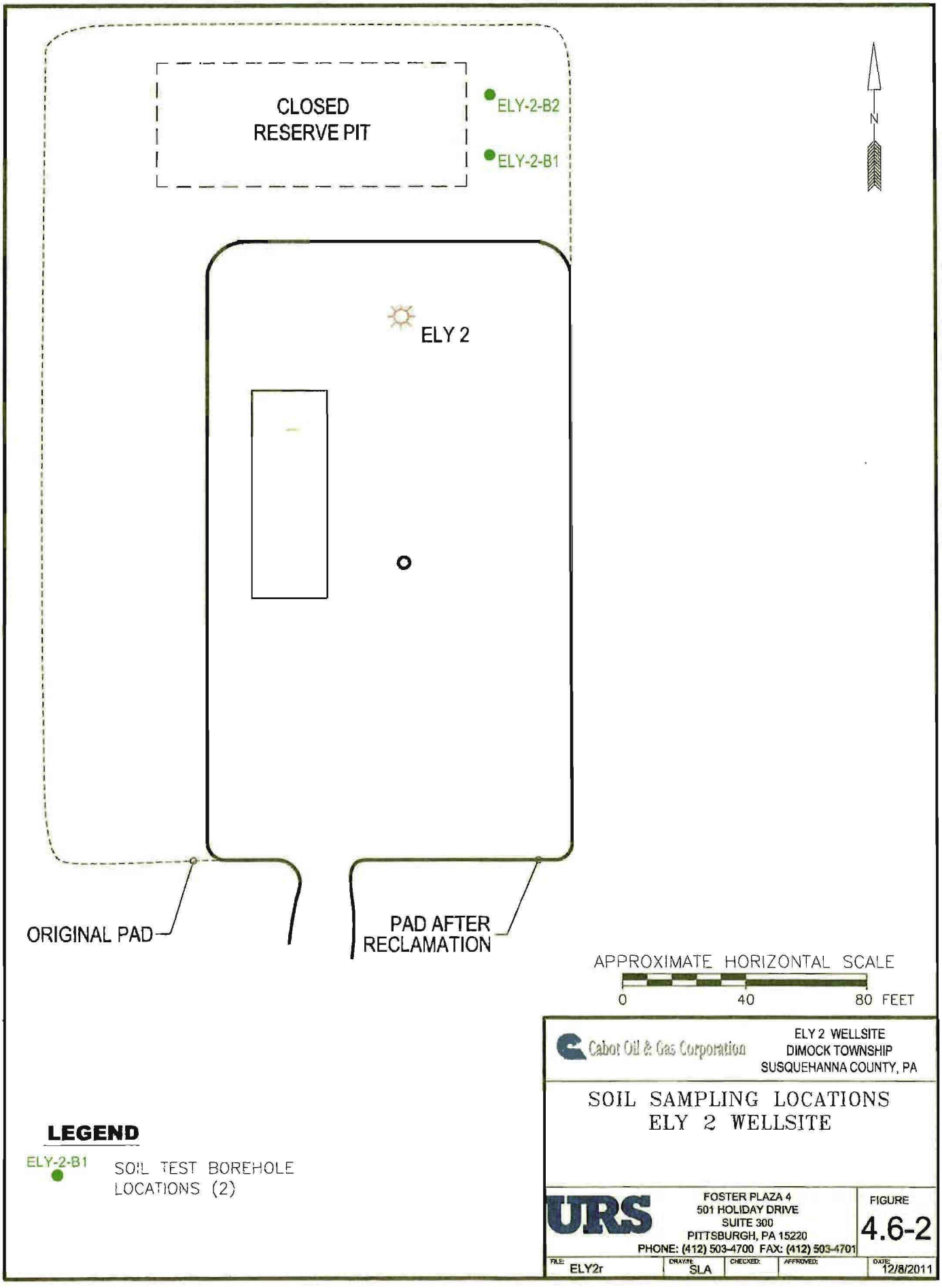


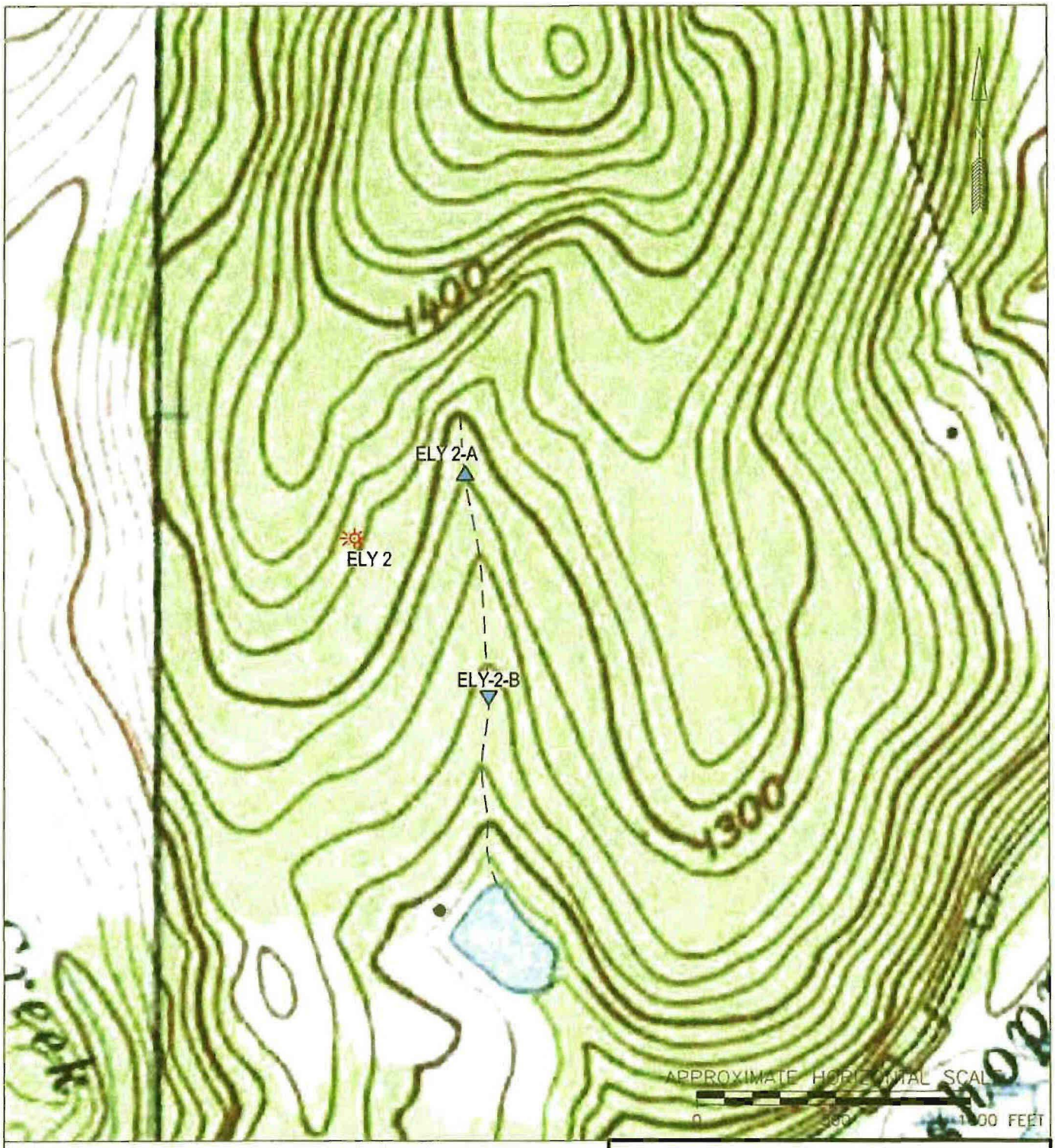
BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.6-1
SITE VICINITY MAP
ELY 2H WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS


CLOSED
RESERVE PIT
ELY-2-B2
ELY-2-B1
N
ELY 2
ORIGINAL PAD
PAD AFTER
RECLAMATION
APPROXIMATE HORIZONTAL SCALE
0
40
80 FEET
LEGEND
ELY-2-B1
SOIL TEST BOREHOLE
LOCATIONS (2)
Cabot Oil & Gas Corporation
ELY 2 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY, PA
SOIL SAMPLING LOCATIONS
ELY 2 WELLSITE
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701
FIGURE
4.6-2
FILE: ELY2r
DRAWN: SLA
CHECKED:
APPROVED:
DATE: 12/8/2011



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

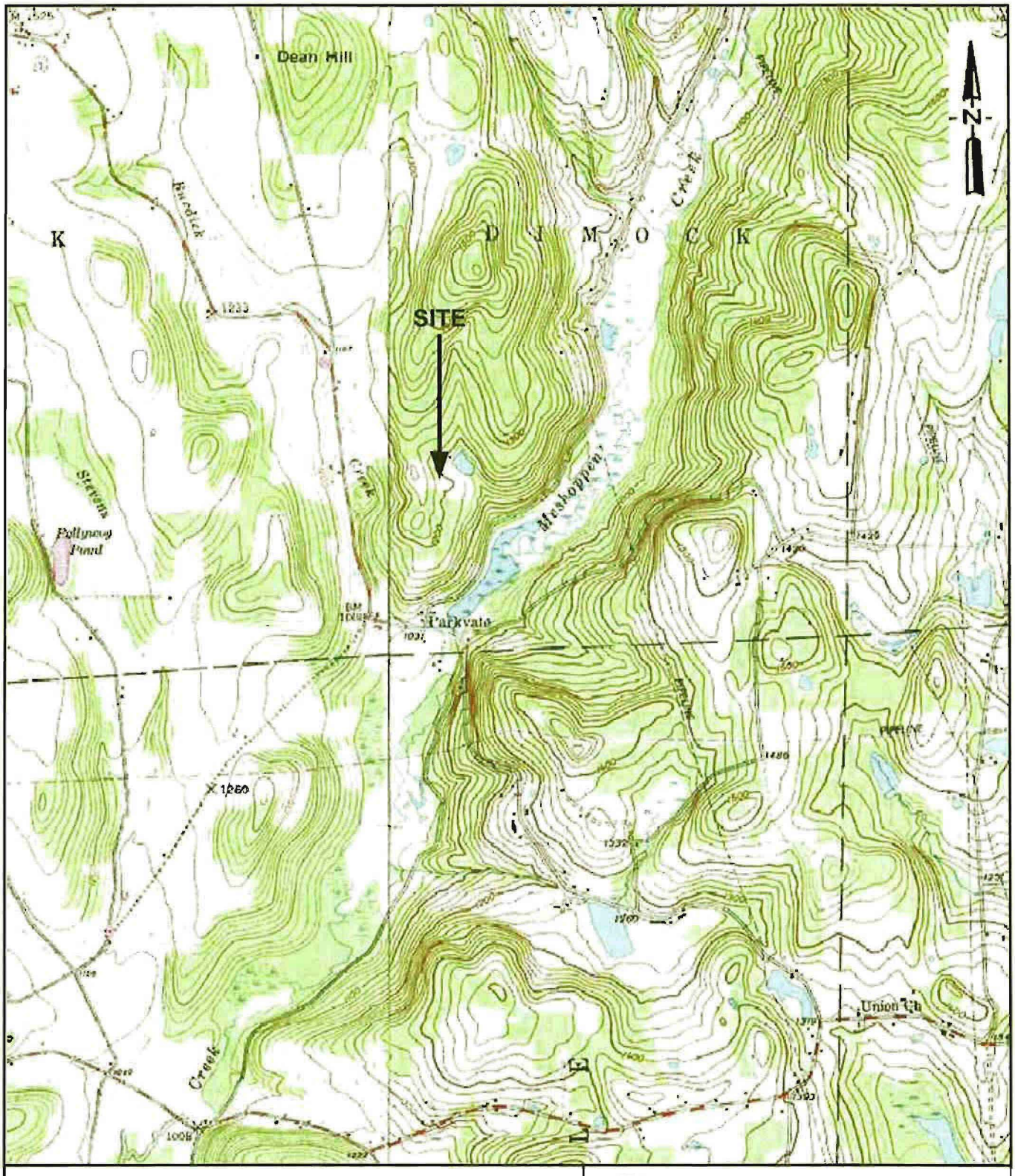
ELY 2 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY, PA

SURFACE WATER SAMPLING LOCATIONS
ELY 2 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.6-3

FILE:	DRAWN:	CHECKED:	APPROVED:	DATE:
ELY2r	SLA			12/8/2011



0 2000 4000

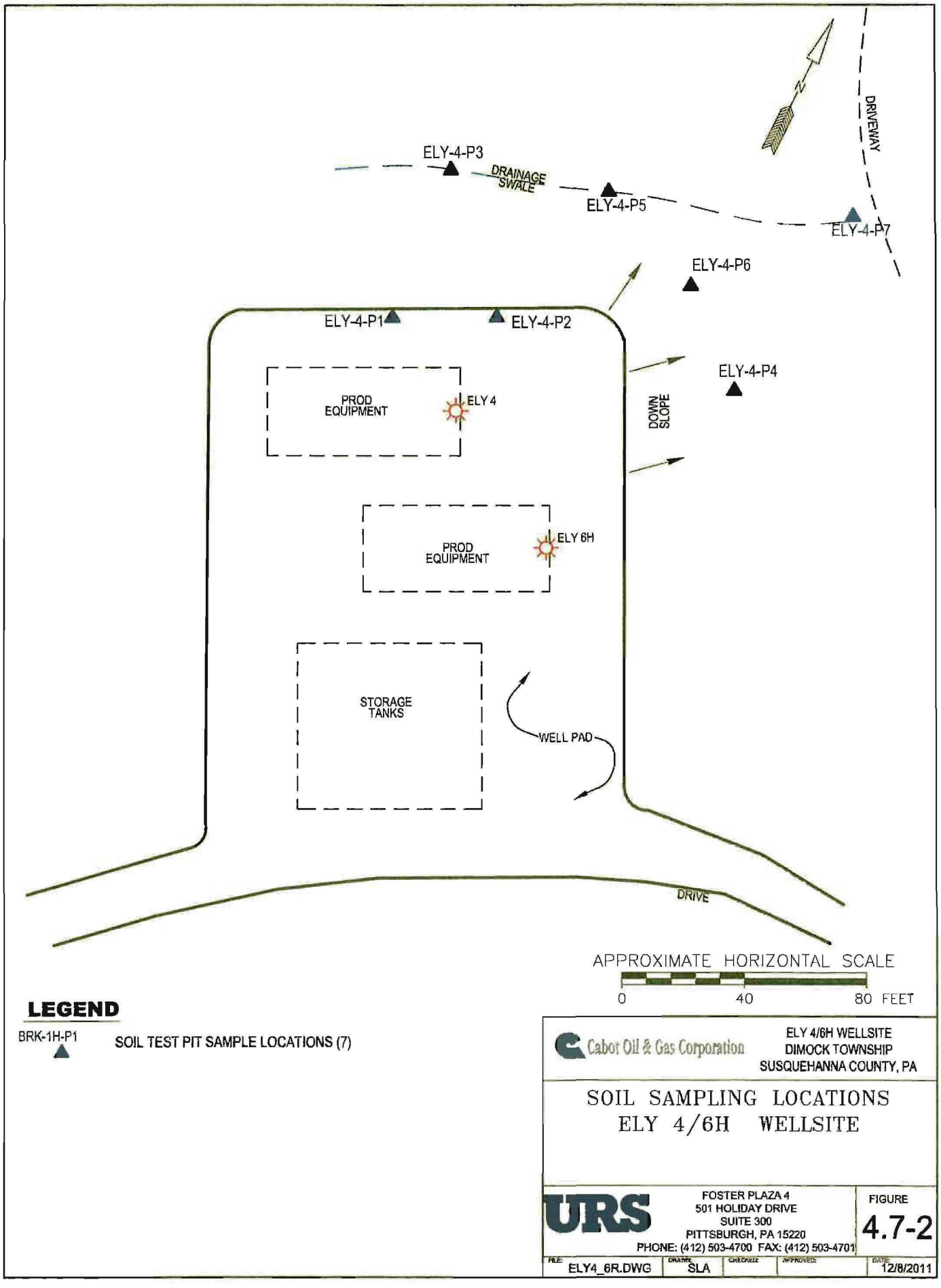
APPROXIMATE SCALE IN FEET

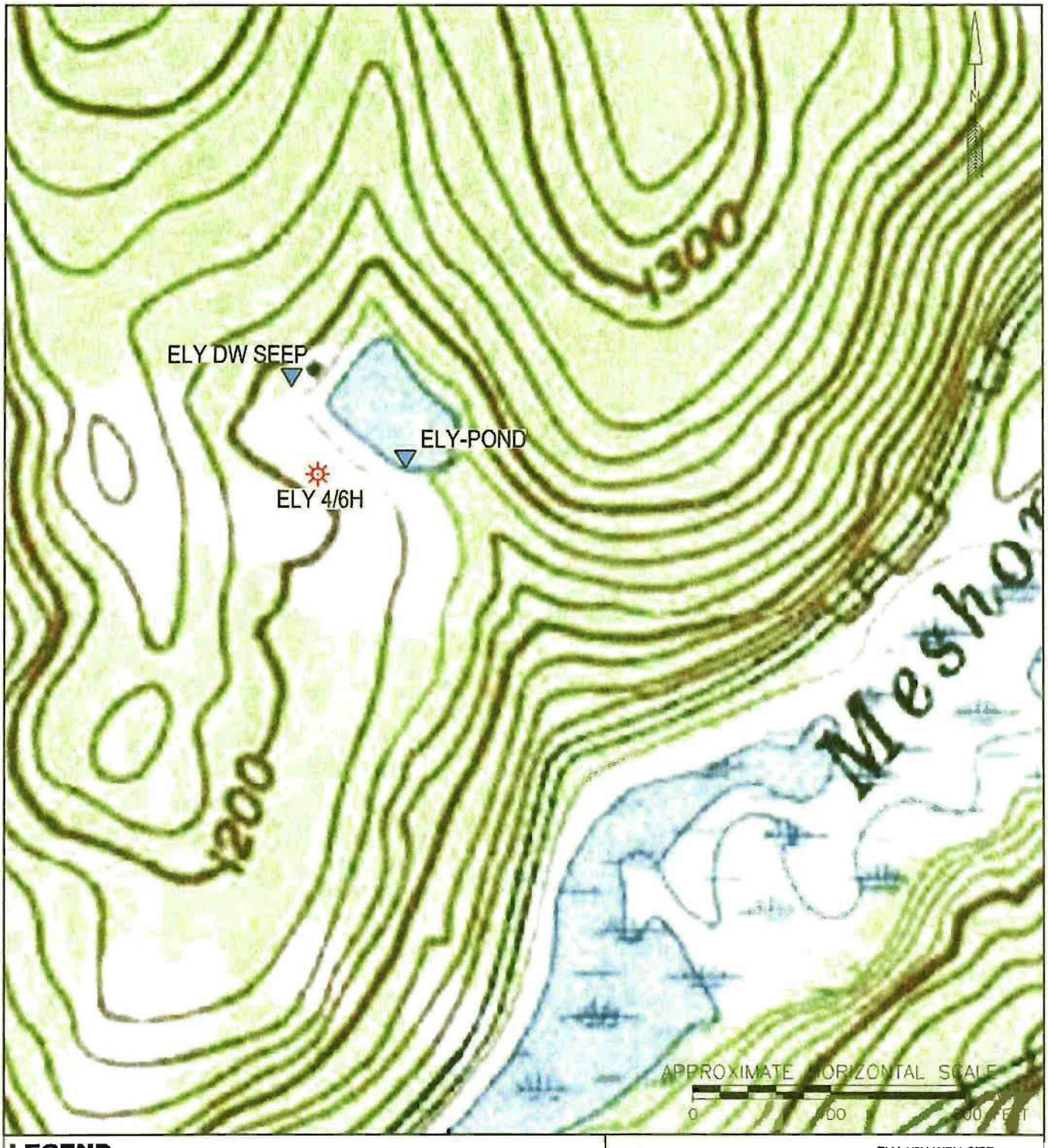
BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.7-1
SITE VICINITY MAP
ELY 4H/6H WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS


DRIVEWAY
ELY-4-P3
DRAINAGE SWALE
ELY-4-P5
ELY-4-P7
ELY-4-P6
ELY-4-P1
ELY-4-P2
ELY-4-P4
PROD EQUIPMENT
ELY 4
DOWN SLOPE
PROD EQUIPMENT
ELY 6H
STORAGE TANKS
WELL PAD
DRIVE
APPROXIMATE HORIZONTAL SCALE
0
40
80 FEET
LEGEND
BRK-1H-P1
SOIL TEST PIT SAMPLE LOCATIONS (7)
Cabot Oil & Gas Corporation
ELY 4/6H WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY, PA
SOIL SAMPLING LOCATIONS
ELY 4/6H WELLSITE
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701
FIGURE
4.7-2
FILE: ELY4_6R.DWG
DRAWN: SLA
CHECKED:
APPROVED:
DATE: 12/8/2011



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

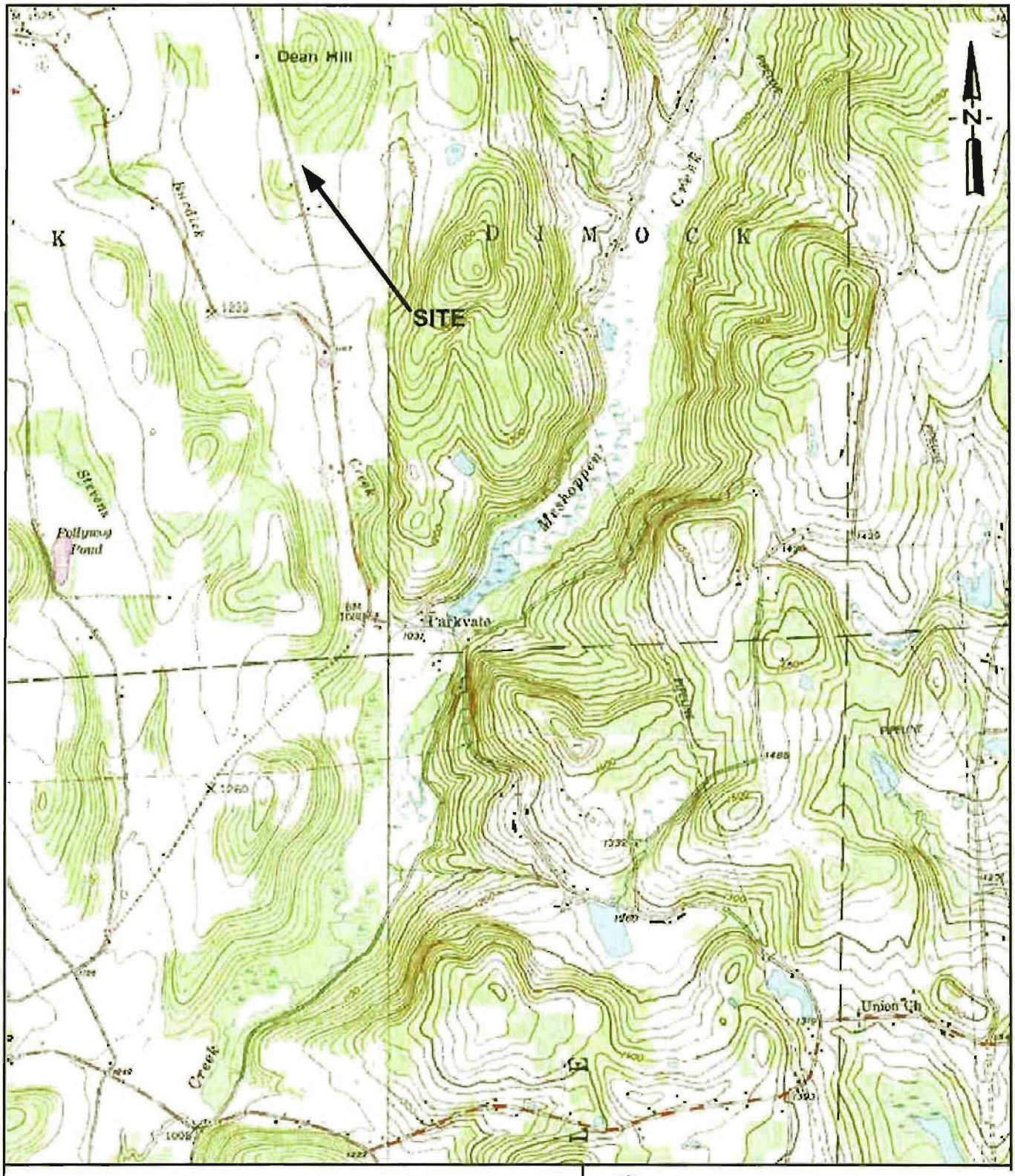
ELY 4/6H WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY, PA

SURFACE WATER SAMPLING LOCATIONS
ELY 4/6H WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

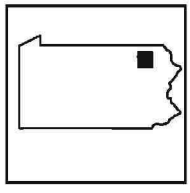
FIGURE 4.7-3

FILE	DRAWN	CHECKED	APPROVED	DATE
ELY4_6R.DWG	SLA			12/8/2011



0 2000 4000

APPROXIMATE SCALE IN FEET

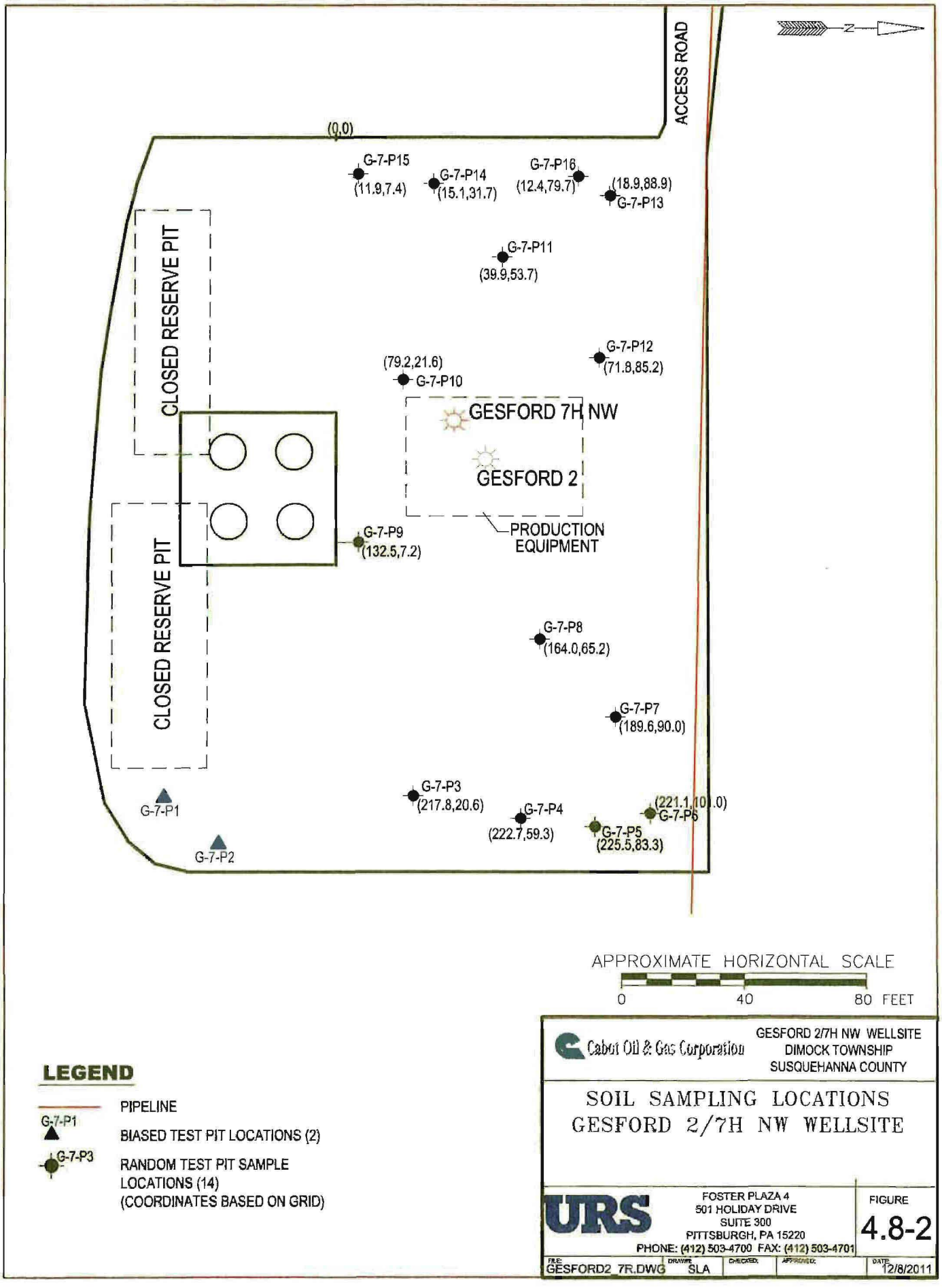


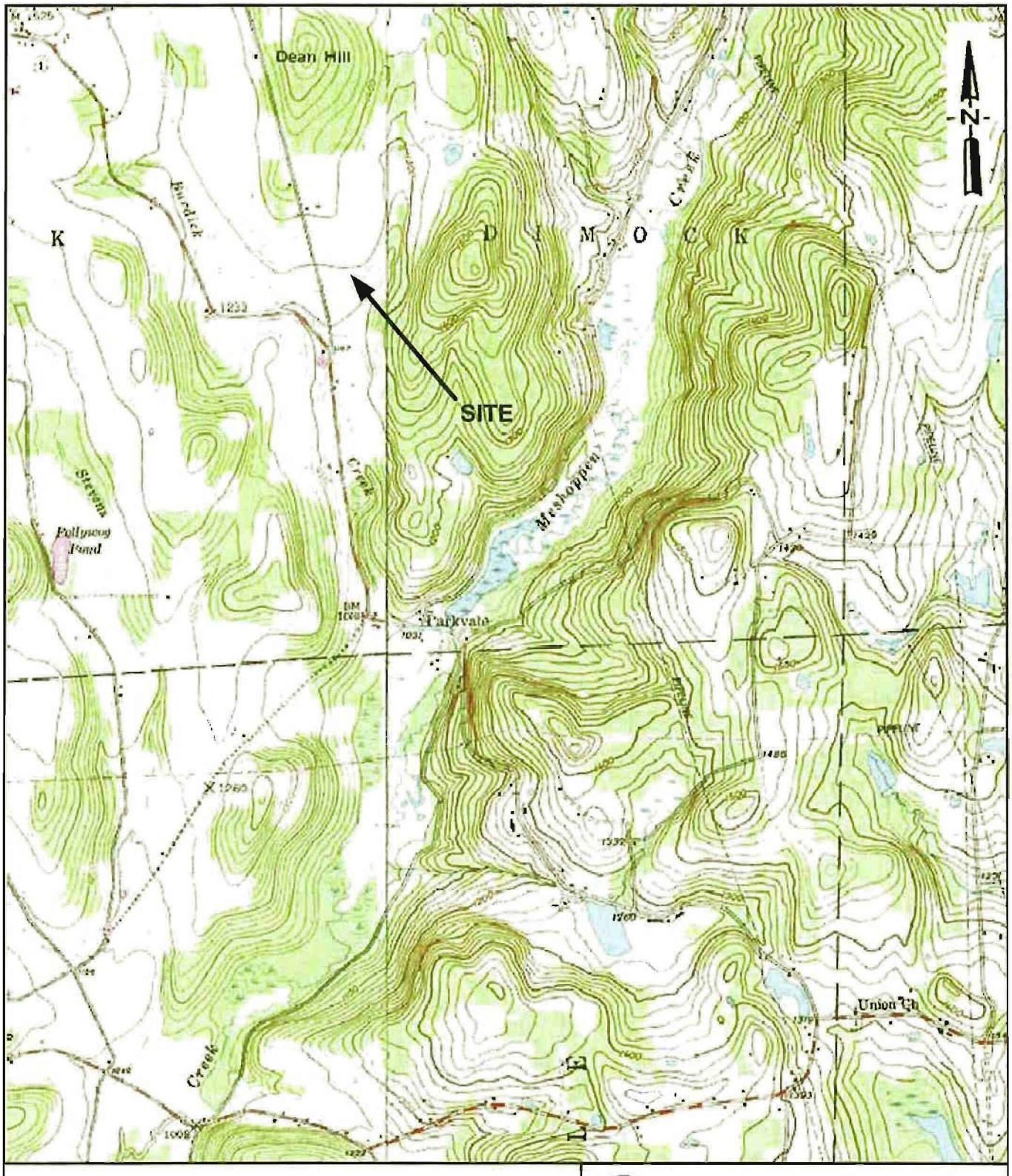
BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.8-1
SITE VICINITY MAP
GESFORD 2H/7H WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

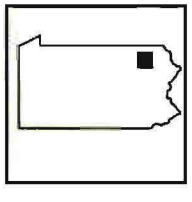
URS


ACCESS ROAD
N
(0,0)
G-7-P15
(11.9,7.4)
G-7-P14
(15.1,31.7)
G-7-P16
(12.4,79.7)
(18.9,88.9)
G-7-P13
G-7-P11
(39.9,53.7)
CLOSED RESERVE PIT
G-7-P12
(71.8,85.2)
(79.2,21.6)
G-7-P10
GESFORD 7H NW
GESFORD 2
PRODUCTION EQUIPMENT
G-7-P9
(132.5,7.2)
CLOSED RESERVE PIT
G-7-P8
(164.0,65.2)
G-7-P7
(189.6,90.0)
G-7-P3
(217.8,20.6)
G-7-P1
G-7-P4
(222.7,59.3)
G-7-P6
G-7-P5
(225.5,83.3)
G-7-P2
APPROXIMATE HORIZONTAL SCALE
0
40
80 FEET
LEGEND
PIPELINE
G-7-P1
BIASED TEST PIT LOCATIONS (2)
G-7-P3
RANDOM TEST PIT SAMPLE LOCATIONS (14)
(COORDINATES BASED ON GRID)
Cabot Oil & Gas Corporation
GESFORD 2/7H NW WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY
SOIL SAMPLING LOCATIONS
GESFORD 2/7H NW WELLSITE
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701
FIGURE
4.8-2
FILE: GESFORD2_7R.DWG
DRAWN: SLA
CHECKED:
APPROVED:
DATE: 12/8/2011



0 2000 4000

APPROXIMATE SCALE IN FEET

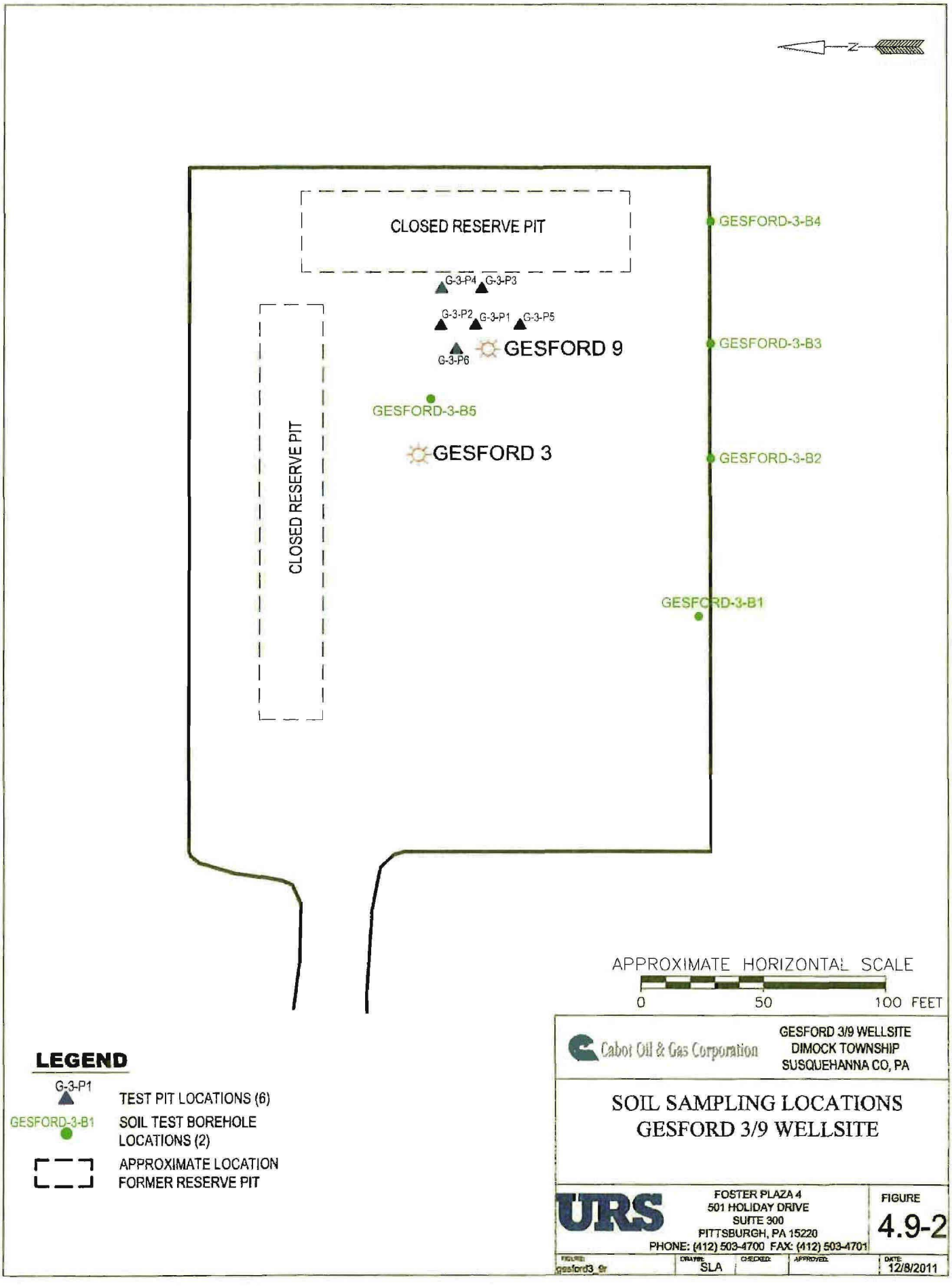


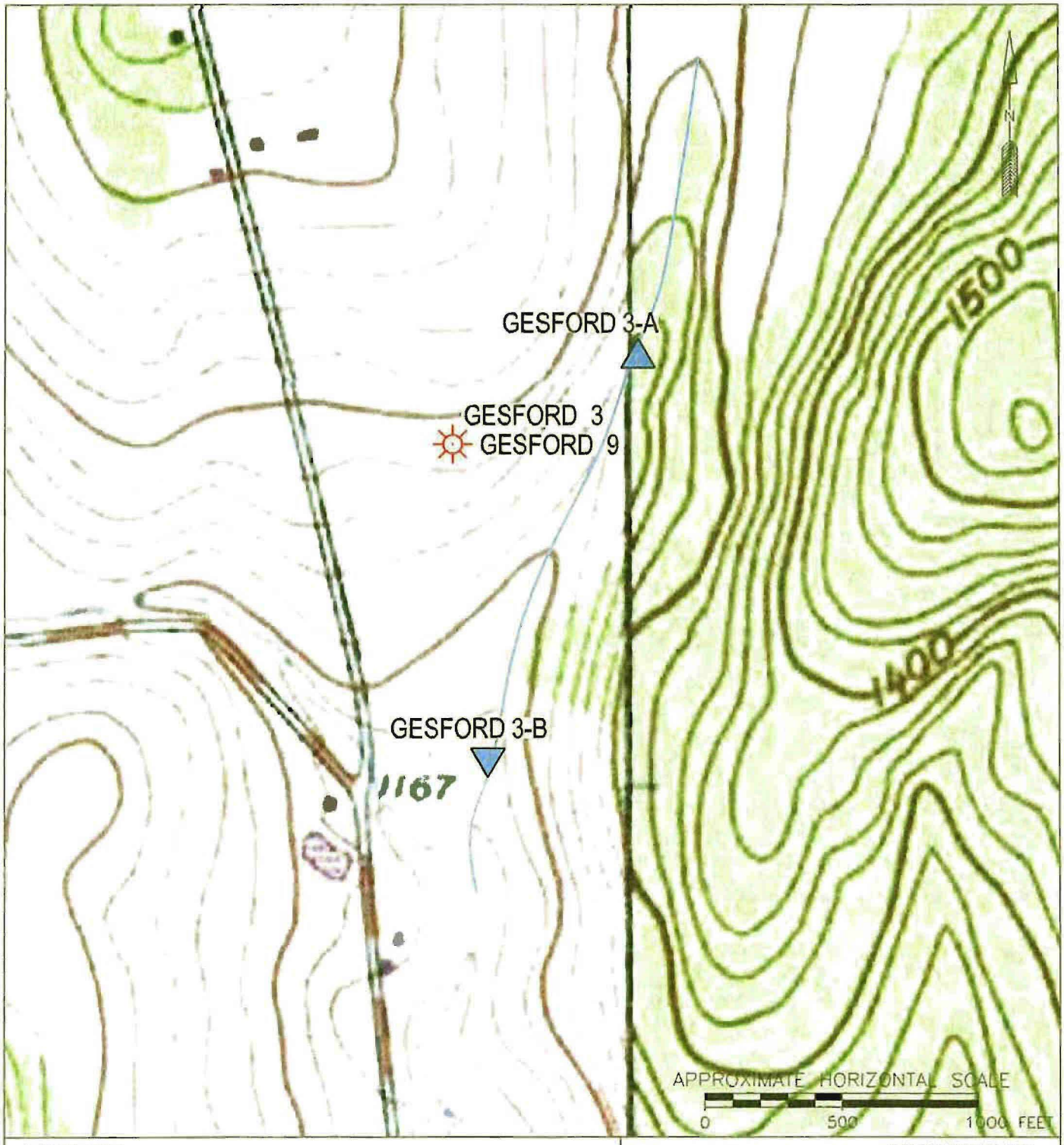
BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.9-1
SITE VICINITY MAP
GESFORD 3V/9V WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS


N
CLOSED RESERVE PIT
GESFORD-3-B4
G-3-P4
G-3-P3
G-3-P2
G-3-P1
G-3-P5
G-3-P6
GESFORD 9
GESFORD-3-B3
GESFORD-3-B5
CLOSED RESERVE PIT
GESFORD 3
GESFORD-3-B2
GESFORD-3-B1
APPROXIMATE HORIZONTAL SCALE
0
50
100 FEET
LEGEND
G-3-P1
TEST PIT LOCATIONS (6)
GESFORD-3-B1
SOIL TEST BOREHOLE LOCATIONS (2)
APPROXIMATE LOCATION FORMER RESERVE PIT
Cabot Oil & Gas Corporation
GESFORD 3/9 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA CO, PA
SOIL SAMPLING LOCATIONS
GESFORD 3/9 WELLSITE
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701
FIGURE
4.9-2
FIGURE: gesford3_fr
DRAWN: SLA
CHECKED:
APPROVED:
DATE: 12/8/2011



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

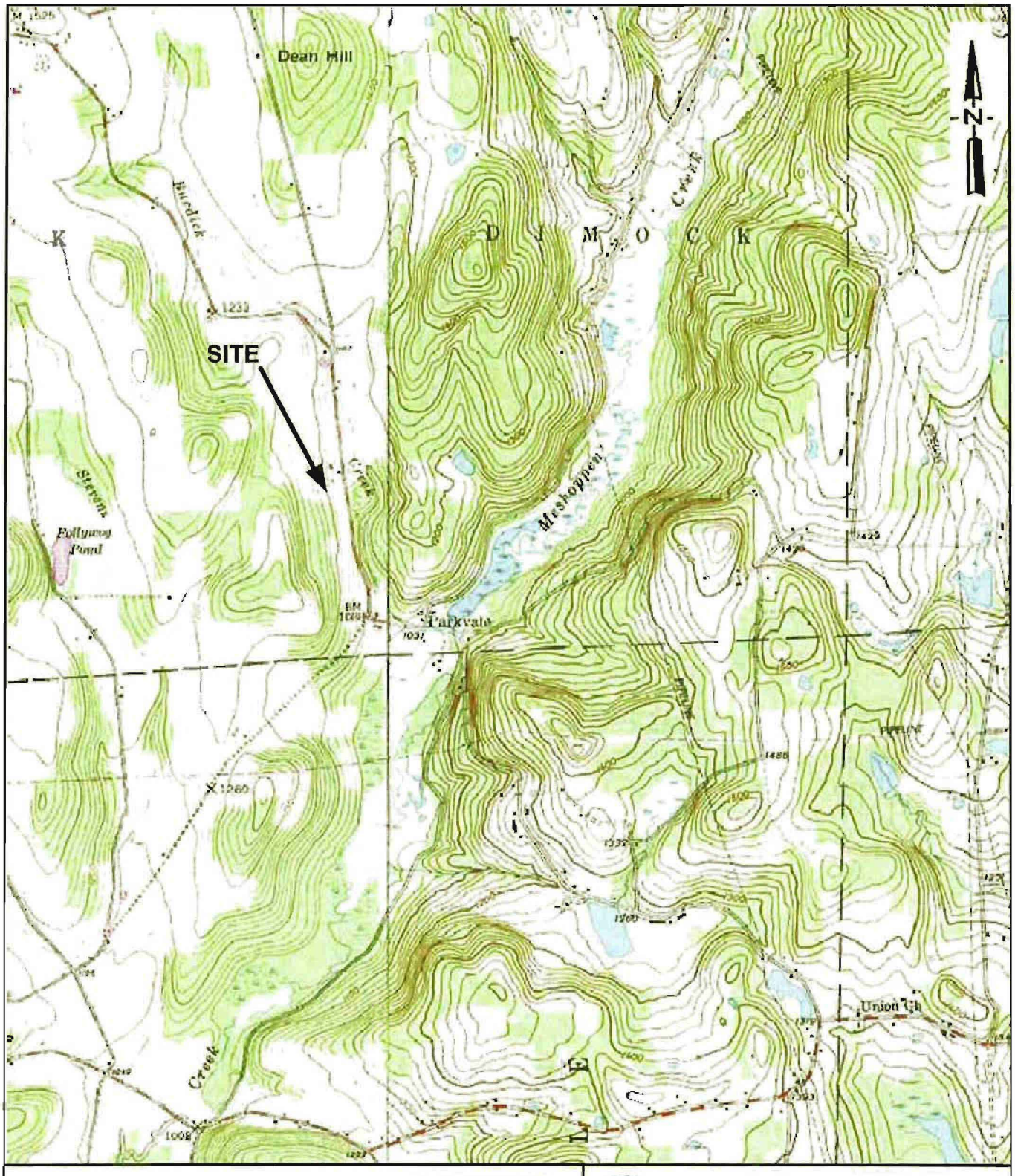
GESFORD 3/9 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA CO, PA

SURFACE WATER SAMPLING LOCATIONS
GESFORD 3/9 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.9-3

FIGURE:	DRAWN:	CHECKED:	APPROVED:	DATE:
gesford3_9r	SLA			12/8/2011

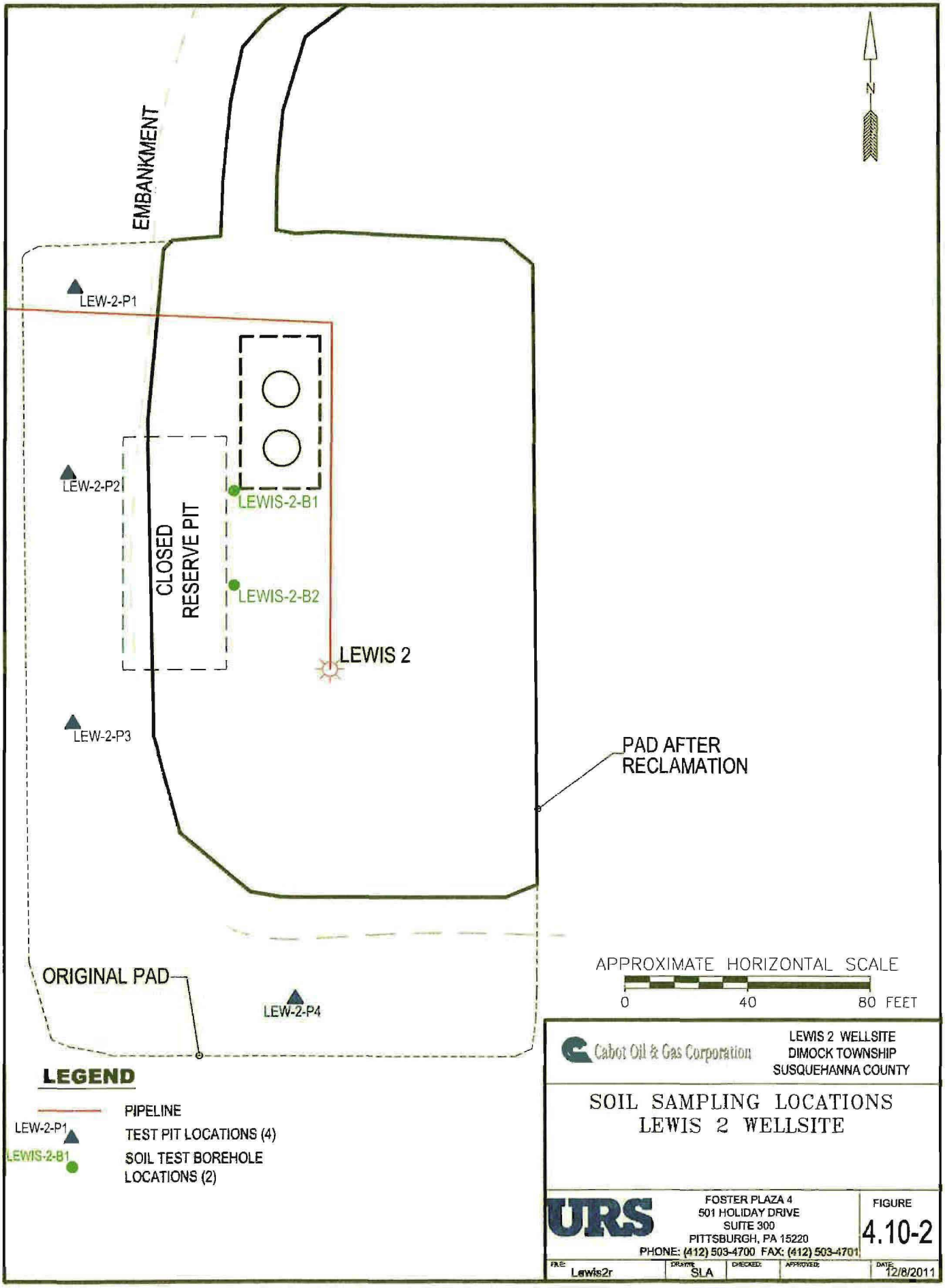


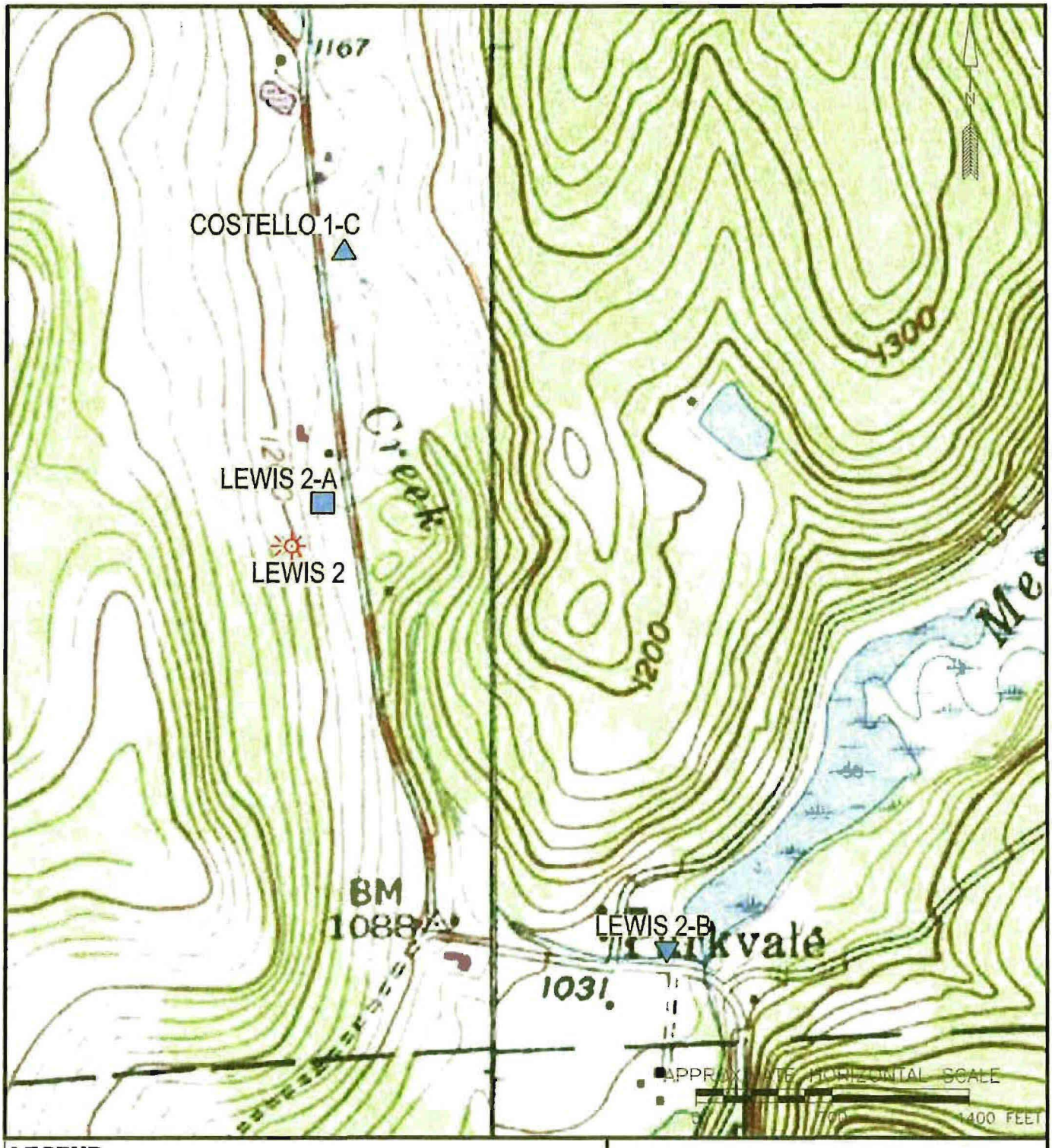
Cabot Oil & Gas Corporation

FIGURE 4.10-1
SITE VICINITY MAP
LEWIS 2H WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvanla (1946, photorevised 1969).

URS


N
EMBANKMENT
LEW-2-P1
LEW-2-P2
LEWIS-2-B1
CLOSED
RESERVE PIT
LEWIS-2-B2
LEWIS 2
LEW-2-P3
PAD AFTER
RECLAMATION
ORIGINAL PAD
LEW-2-P4
APPROXIMATE HORIZONTAL SCALE
0
40
80 FEET
LEGEND
PIPELINE
LEW-2-P1
TEST PIT LOCATIONS (4)
LEWIS-2-B1
SOIL TEST BOREHOLE
LOCATIONS (2)
Cabot Oil & Gas Corporation
LEWIS 2 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY
SOIL SAMPLING LOCATIONS
LEWIS 2 WELLSITE
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701
FIGURE
4.10-2
FILE: Lewis2r
DRAWN: SLA
CHECKED:
APPROVED:
DATE: 12/8/2011



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS
- SIDE GRADIENT/OTHER SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

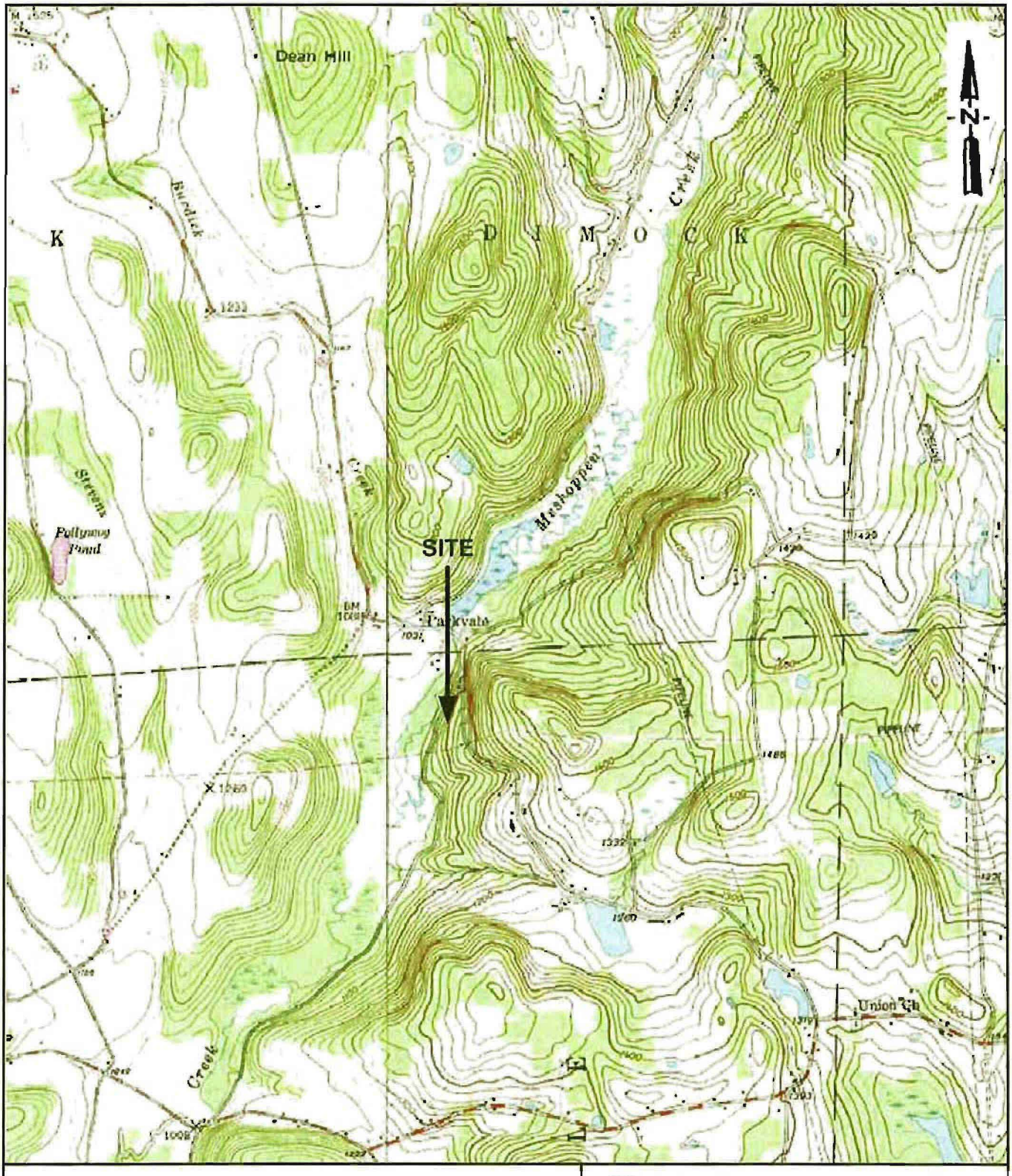
LEWIS 2 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY

SURFACE WATER SAMPLING LOCATIONS
LEWIS 2 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE
4.10-3

FILE	DRAWN	CHECKED	APPROVED	DATE
Lewis2r	SLA			12/8/2011

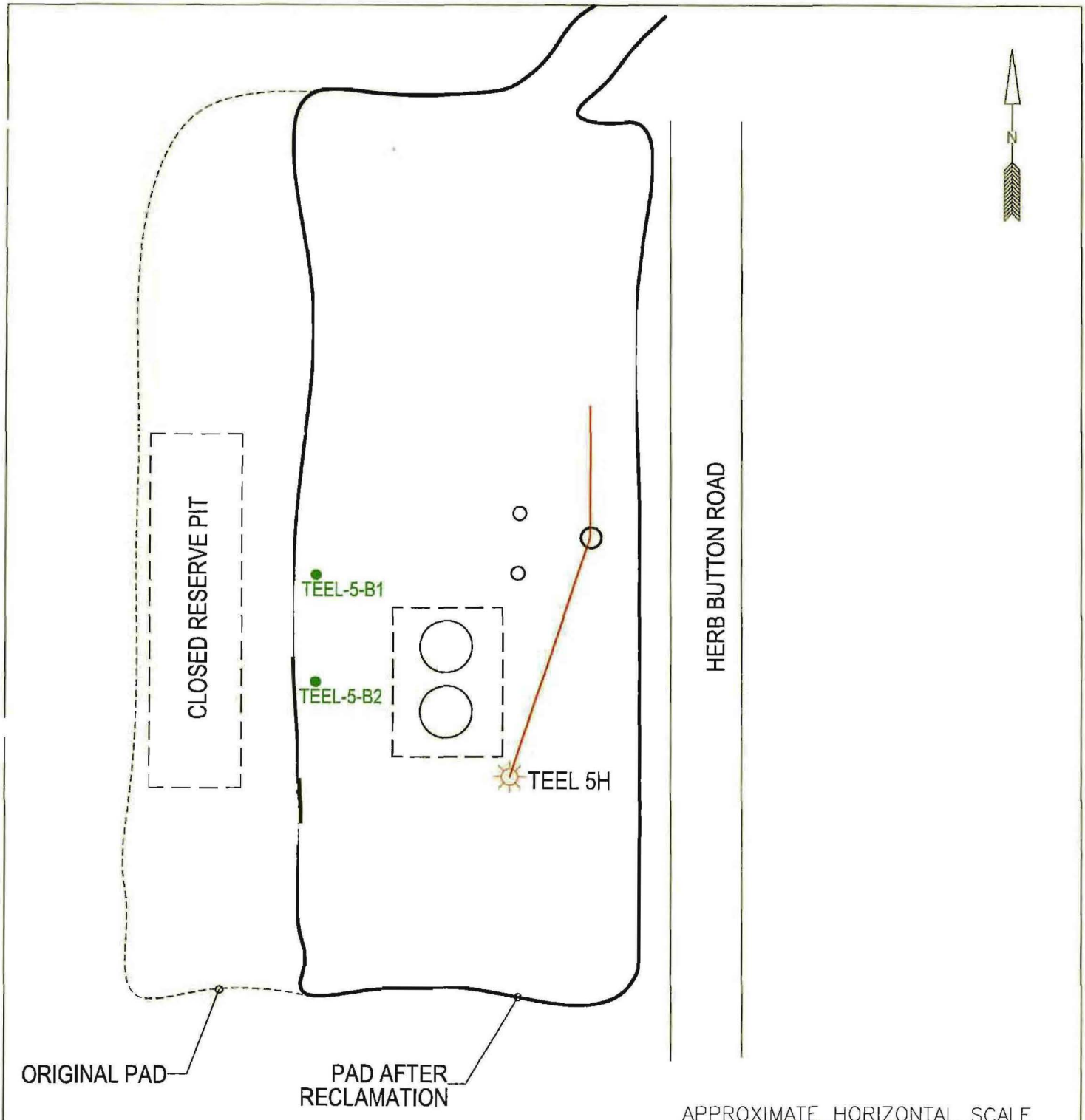


BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.11-1
SITE VICINITY MAP
TEEL 5H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS



APPROXIMATE HORIZONTAL SCALE

0 40 80 FEET

LEGEND

PIPELINE

TEEL-5-B1 SOIL TEST BOREHOLE LOCATIONS (2)

Cabot Oil & Gas Corporation

TEEL 5H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY

SOIL SAMPLING LOCATIONS TEEL 5H WELLSITE

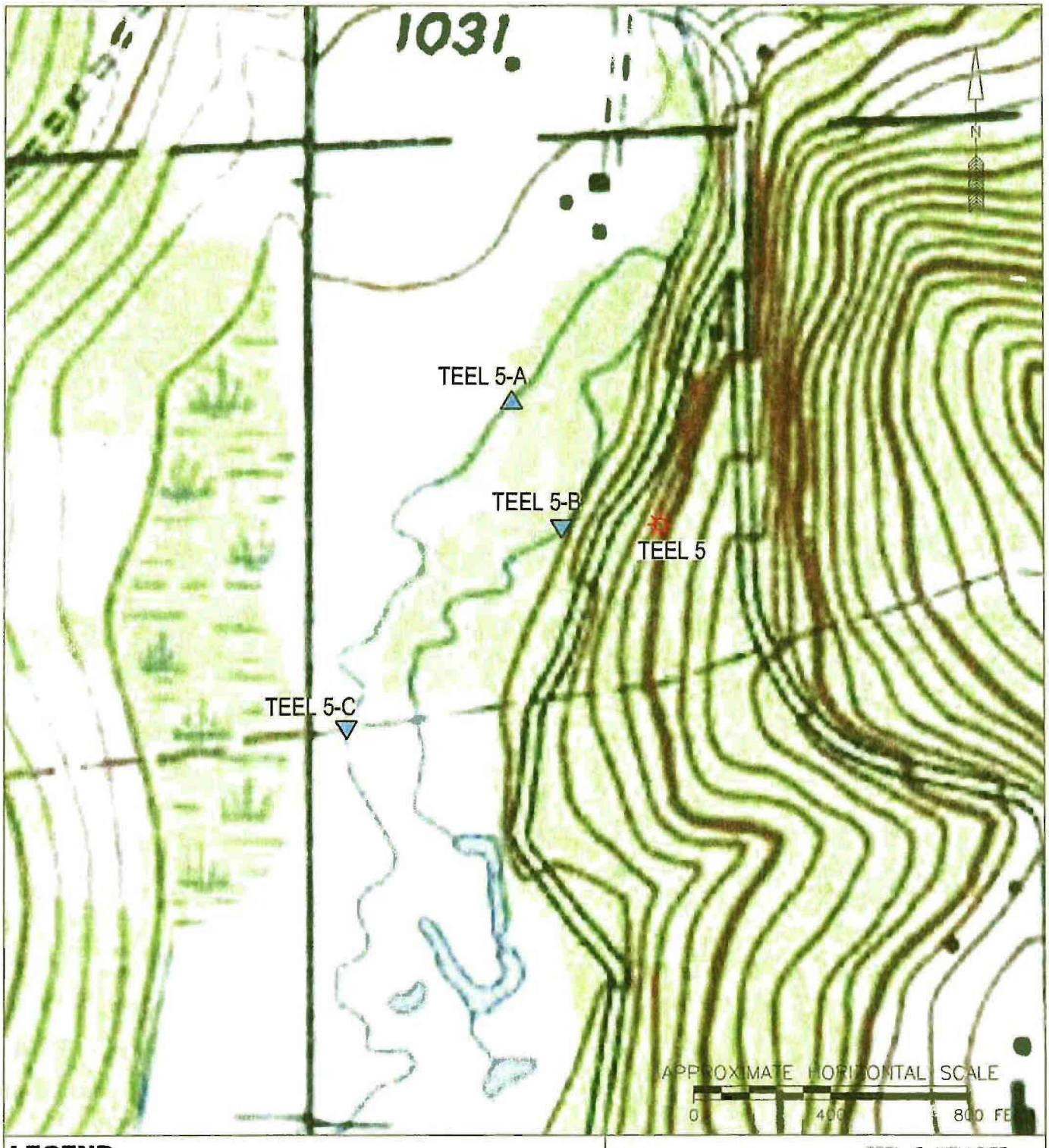
URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE 4.11-2

FILE:	DRAWN:	CHECKED:	APPROVED:	DATE:
Teel5	SLA			12/5/2011

DIM0209034

DIM0209207



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

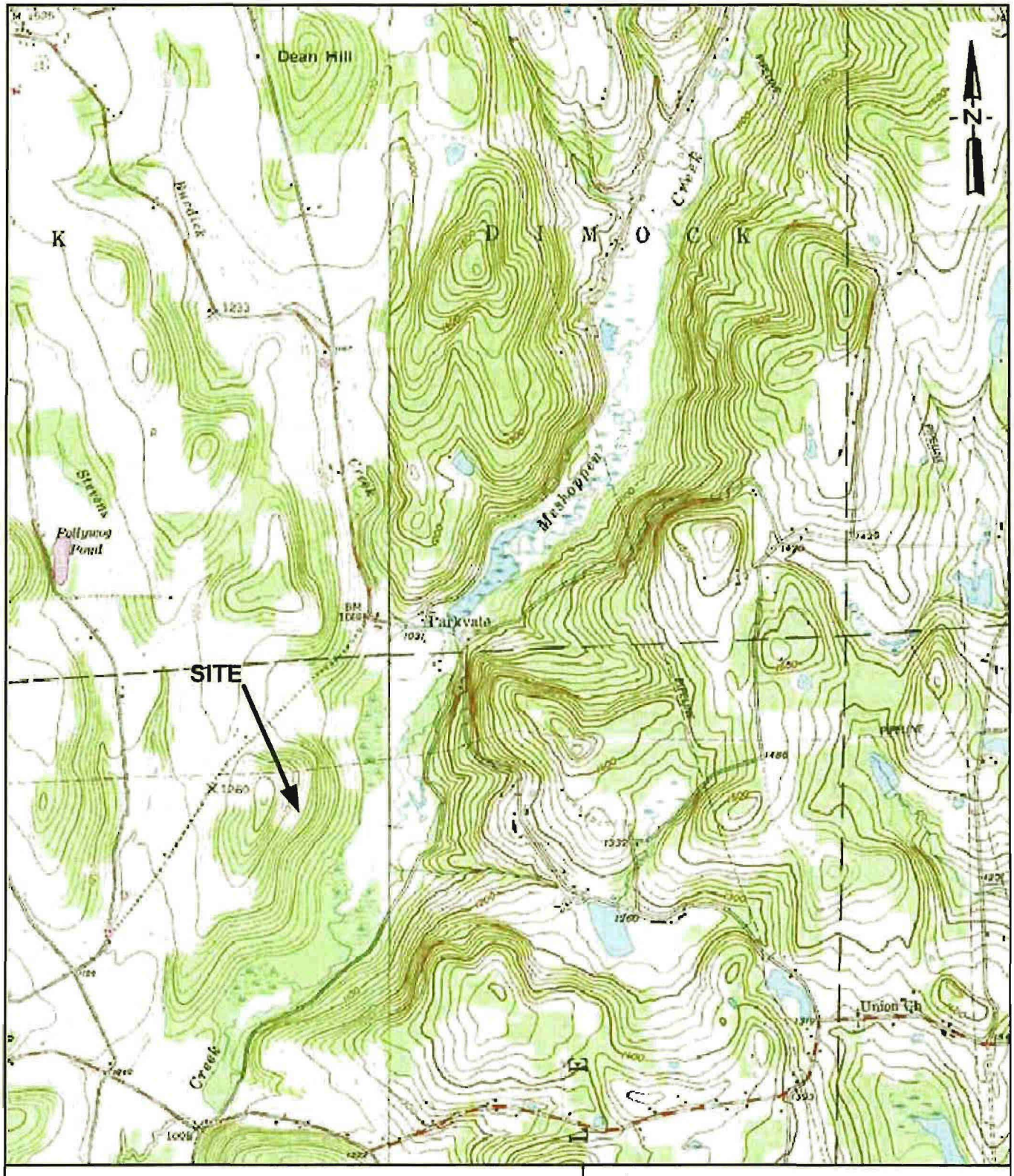
TEEL 5 WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY

SURFACE WATER SAMPLING LOCATIONS
TEEL 5 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

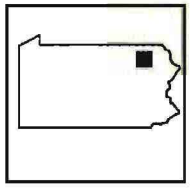
FIGURE
4.11-3

FILE	DRAWN	CHECKED	APPROVED	DATE
Teel5r	SLA			12/8/2011



0 2000 4000

APPROXIMATE SCALE IN FEET

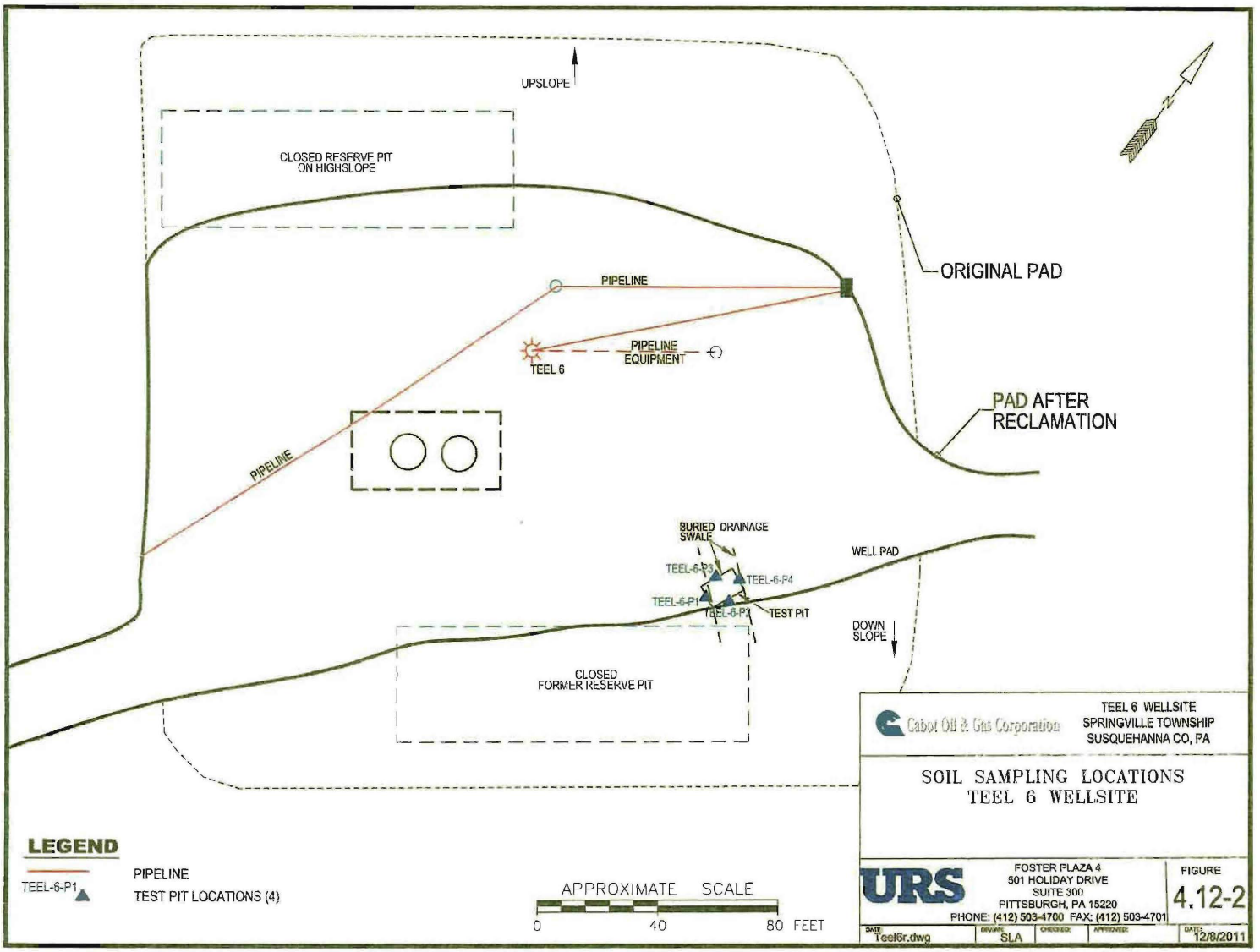


BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

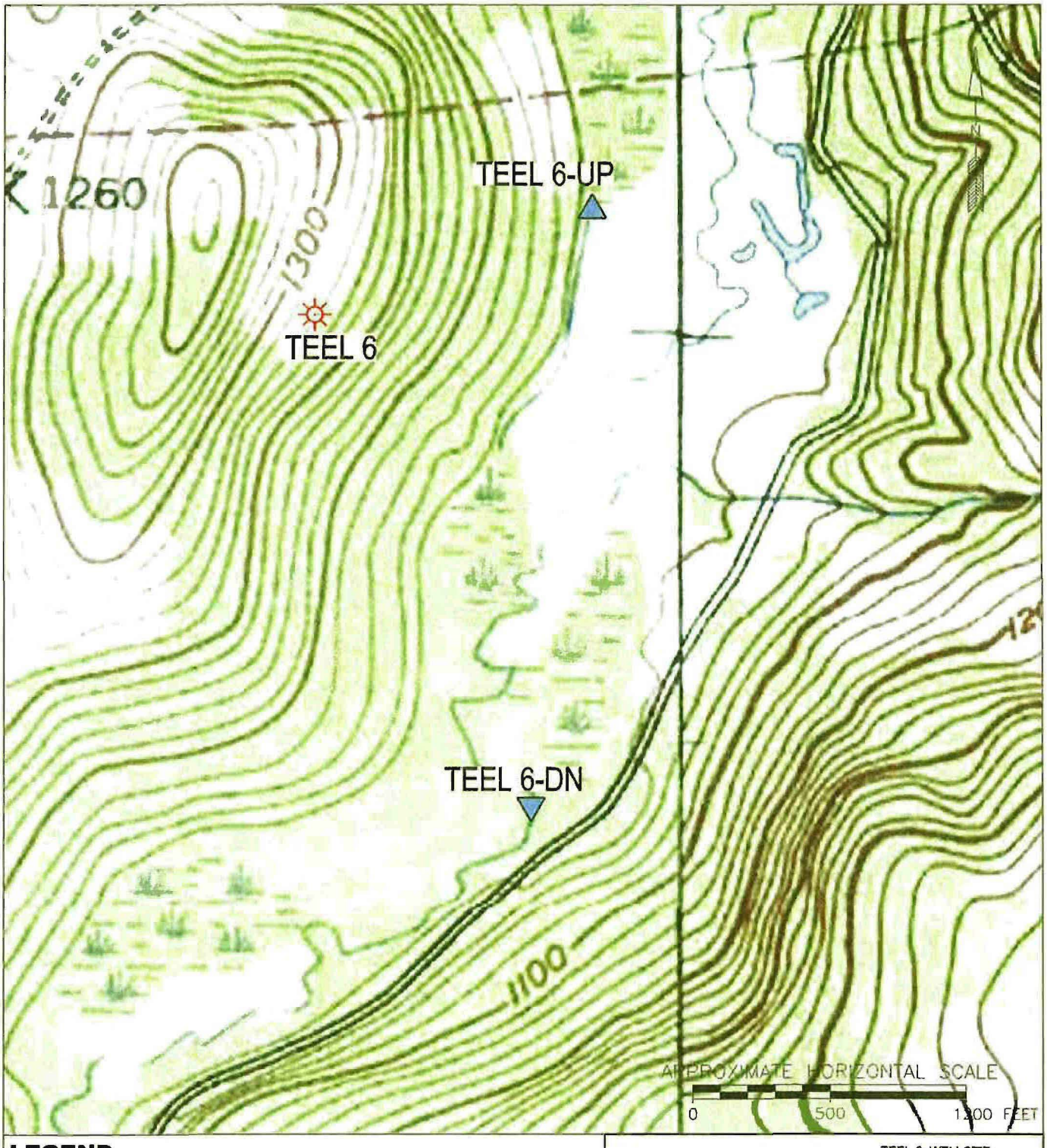
FIGURE 4.12-1
SITE VICINITY MAP
TEEL 6H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS



DIM0209034

DIM0209210



LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

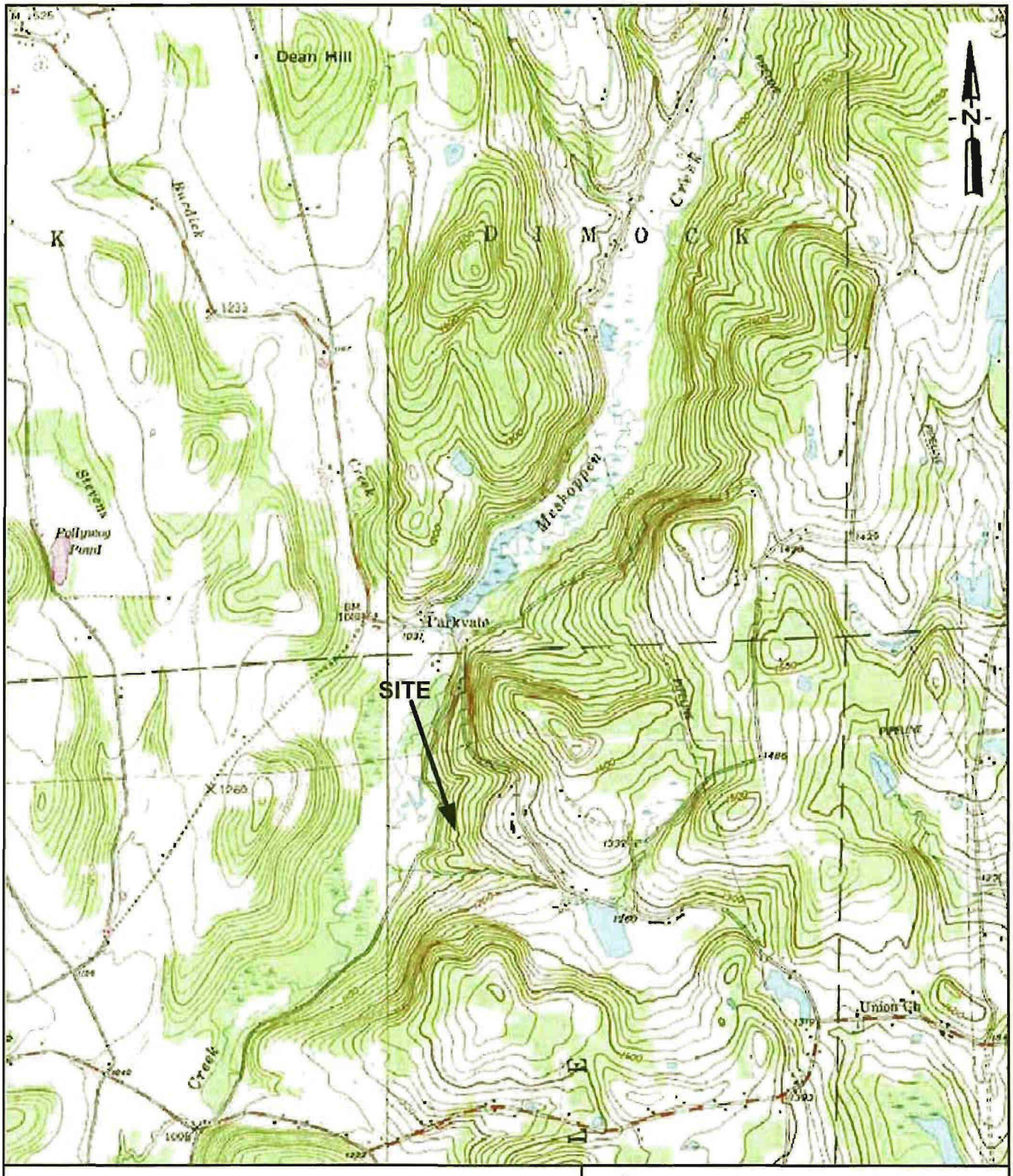
TEEL 6 WELLSITE
DIMOCK TOWNSHIP
SUSQUEHANNA COUNTY, PA

SURFACE WATER SAMPLING LOCATIONS
TEEL 6 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE
4.12-3

FILE:	CREATED:	CHECKED:	APPROVED:	DATE:
Teel6r	SLA			12/8/2011



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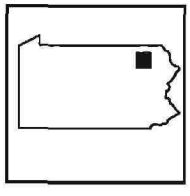
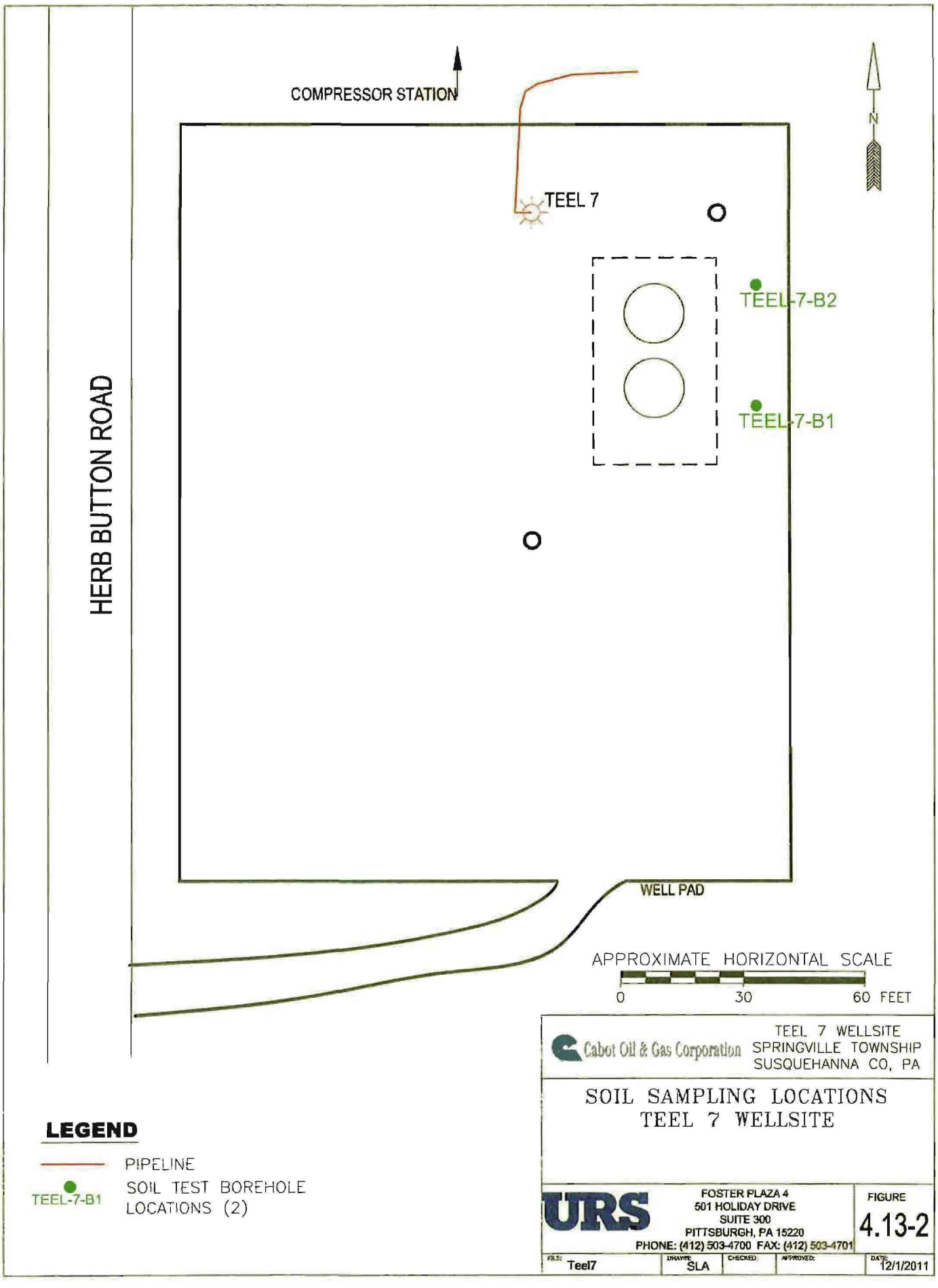


BASE MAP SOURCE: USGS 7.5 minute series topographic quadrangle map Hop Bottom, Pennsylvania (1994), Springville, Pennsylvania (1946, photorevised 1969).

Cabot Oil & Gas Corporation

FIGURE 4.13-1
SITE VICINITY MAP
TEEL 7H WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA COUNTY PENNSYLVANIA

URS



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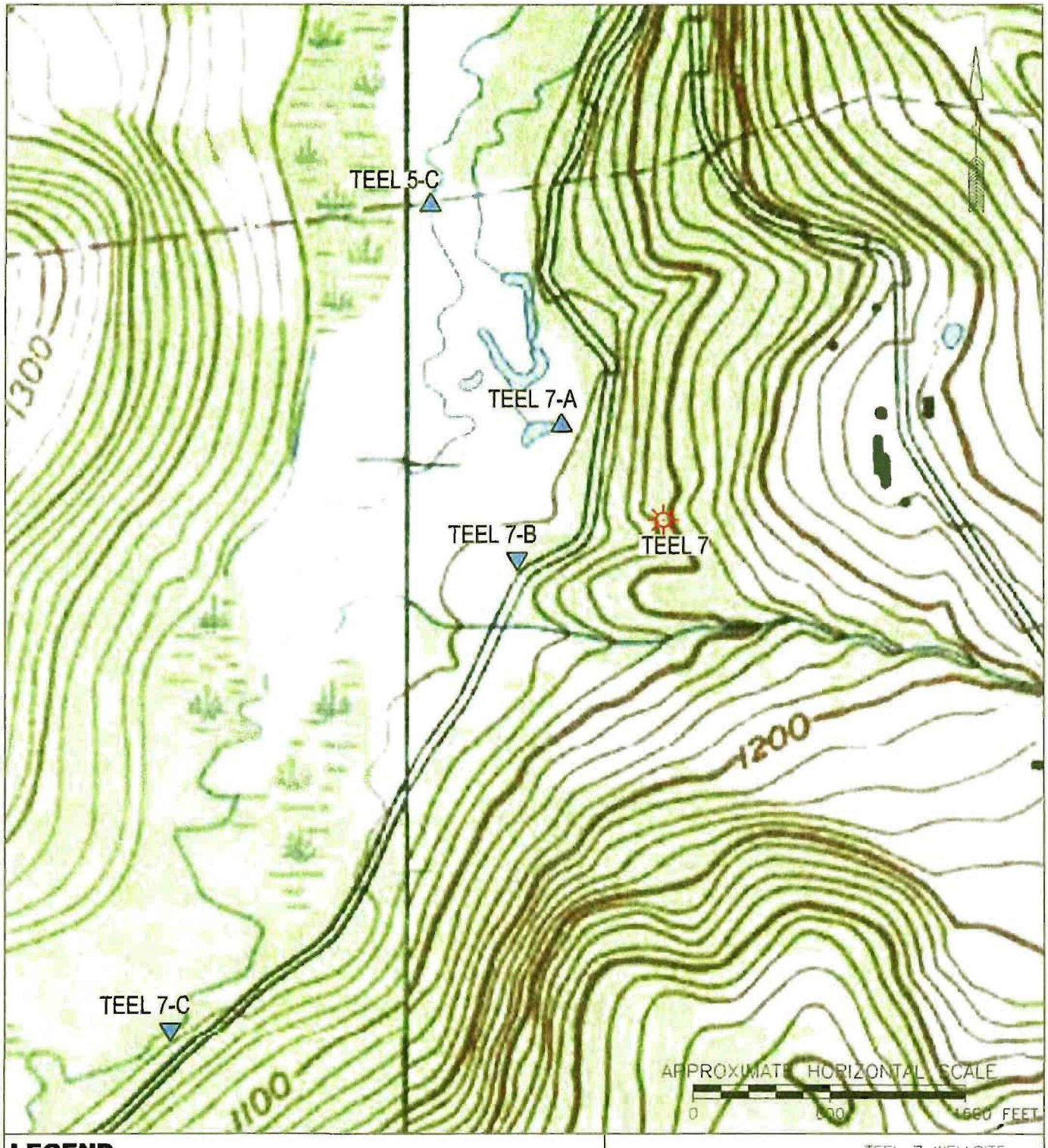

LEGEND

- GAS WELL
- DOWNGRADIENT SURFACE WATER SAMPLING LOCATIONS
- UPGRADIENT SURFACE WATER SAMPLING LOCATIONS

Cabot Oil & Gas Corporation

TEEL 7 WELLSITE
SPRINGVILLE TOWNSHIP
SUSQUEHANNA CO, PA

SURFACE WATER SAMPLING LOCATIONS
TEEL 7 WELLSITE

URS
FOSTER PLAZA 4
501 HOLIDAY DRIVE
SUITE 300
PITTSBURGH, PA 15220
PHONE: (412) 503-4700 FAX: (412) 503-4701

FIGURE
4.13-3

FILE:	DRAWN:	CHECKED:	APPROVED:	DATE:
Teel7r	SLA			12/8/2011

APPENDIX A

URS

May 3, 2010 *Via Electronic Mail*

K&L Gates LLP
Henry W. Oliver Building
535 Smithfield Street
Pittsburgh, PA 15222-2312

Attention: Mr. Ken Komoroski

Re: Second Revised Scope of Services for Preliminary Site Evaluations
Incorporating Pennsylvania Department of Environmental Protection Comments
Potential Diesel Release Areas and Other Areas of Environmental Concern
Susquehanna County, Pennsylvania

Dear Mr. Komoroski:

URS Corporation (URS) is pleased to present K&L Gates and Cabot Oil & Gas Corporation (Cabot) with this Work Plan describing the scope of work developed to address allegations by Mr. Scott Ely regarding well sites operated by Cabot in Dimock and Springville Townships, Susquehanna County, Pennsylvania.

In response to [Ex. 6 - Personal Privacy] allegations, Cabot launched an investigation of the conditions and potential environmental impact of those conditions at well sites identified by [Ex. 6 - Personal Privacy]. As part of the ongoing investigation, Cabot requested that URS prepare a scope of work designed to evaluate potential environmental issues that may exist, based on [Ex. 6 - Personal Privacy] representations to Cabot and the PADEP.

Prior to completion of this Work Plan, URS collected two rounds of water and soil samples near eight (8) of the sites in question. The locations of these samples were based upon information available to URS at the time in relation to [Ex. 6 - Personal Privacy]s allegations and the results will be used to help evaluate for potential impacts in these areas due to site operations.

In addition to these sample results, URS has identified the following data needs:

- Pertinent field notes and analytical results for all well sites and surrounding

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Foster Plaza 4
1 Holiday Drive, Suite 300
Pittsburgh, PA 15220
Tel: (412) 503-4700
Fax: (412) 503-4701

Via Electronic Mail

areas evaluated as part of prior Pennsylvania Department of Environmental Protection (PADEP) investigations and evaluations.

- Associated environmental reports and data accumulated by Cabot and its consultants regarding investigations and evaluations (including background or baseline sampling and analysis conducted prior to well installation, Act 2 reports, etc).

Many of Ex. 6 - Personal Privacy s allegations related to concerns of contamination resulting from drill pits. Cabot has supplied the following information regarding the materials stored or disposed in the pits and the practices employed to close these pits:

A drill pit stores drilling fluid (mud) and cuttings from the formation that has been drilled. Cabot uses fresh water with drilling additives typical for the industry to drill wells in the Marcellus Shale. Fresh-water drilling mud composition used by Cabot generally includes the following:

- 73% Fresh water:
- 23% Barite (barium sulfate; insoluable in water, same as given to patients used in X-ray procedures);
- 3% Anco Gel (sodium montmorillonite);
- 0.75% Spec Pac (polyanionic cellulose);
- 0.1% Caustic Soda (sodium hydroxide);
- 0.1% Desco (0.0001% chromium acetate, .009% proprietary sulfomethylated tannin); and
- 0.05% Anco Defoam (demulsifier having about 200 ppm methyl alcohol and about 400 ppm isopropyl alcohol).

Reserve pits are constructed by excavation at the well pad location. The excavation walls and floor are smoothed and a layer of a geo-textile material is placed within the excavated area of the pit and a plastic liner is installed over the geotextile. The geotextile is used to protect the liner as mud is placed in the pit. After the well has been drilled, the fluid from the pit is recovered and either reused or disposed at an approved disposal facility. Cement is mixed in with the residual cuttings remaining in the pits after fluids are removed to solidify/stabilize these materials. The pit liner is then folded over the stabilized cuttings and native soil or wellpad material is placed over the top of the pit liner.

Scope of Work to Address Ex. 6 - Personal Privacy *Allegations -- **General Conditions** to be implemented as part of this Work Plan:*

The parameters to be used to evaluate the possible impact of the alleged incidents are as follows (See attached **Table 1** for surface water and groundwater samples, and **Table 2** for soils – note that the analytical method, suite of parameters, and reporting limits are provided):

Via Electronic Mail

- **Extended Analytical Suite** *(see Table 1)*
  - Volatile Organic Compounds (VOCs) - Target Compound List [TCL] + Specific Parameters identified and requested by PADEP
  - Semi-Volatile Organic Compounds (SVOCs) - TCL + 10 tentatively identified compounds (TICs)
  - Total and Dissolved Metals Target Analyte List (TAL)
  - Ethylene glycol
  - Acidity
  - Alkalinity
  - Total Dissolved Solids (TDS)
  - Chloride
  - pH
  - Diesel and Gasoline Range Organics (DRO and GRO) - using SW-8015B Modified
  - Nitrogen as Ammonia
  - MBAS – Surfactants
  - Total Petroleum Hydrocarbons (TPH) - Method EPA 1664A

- **Extended Analytical Suite** *(see Table 2)*
  - VOCs - TCL + Special Parameters
  - SVOCs - TCL+ 10 TICs
  - Total Metals – TAL
  - Ethylene glycol
  - Chloride
  - pH
  - DRO and GRO - using SW-8015B Modified
  - Nitrogen as Ammonia
  - MBAS – Surfactants

- **Pit/Frac Analytical Suite** *(see Table 2)*
  - VOCs - TCL+ Special Parameters
  - SVOCs - TCL + 10 TICs
  - Total metals
  - Ammonia
  - Ethylene glycol
  - MBAS
  - Chlorides

- **PA Short List of Petroleum Products** *(see Tables 1 and 2)*
  - All analytes specified by PADEP on Pennsylvania Petroleum Product Short Lists for the various petroleum products (taken from the VOCs and SVOCs in Table 2)

- **PA Short List for Diesel** *(see Tables 1 and 2)*
  - All analytes specified by PADEP on PA Short List for Diesel

Via Electronic Mail

Soil test boreholes to evaluate for impacts from drill pits that are alleged to have been closed improperly will be conducted as follows:

- Boreholes will be located immediately downgradient of the drill pit.
- If the downgradient location cannot be determined or is not readily identifiable, boreholes will be advanced alongside both long edges of the pits.
- Boreholes will be located as close to the reported location of the former drill pit as is practicable without compromising the integrity of the liner.
- Boreholes will be advanced to a depth below the reported depth of the drill pit. URS has estimated the depth of a typical borehole to be 12 feet below ground surface (bgs), with 4 feet being augered through the well pad and 8 feet being cored using direct push technique. A continuous core will be collected in plastic sleeves that will be logged and sampled where impacts are observed. If no impacts are observed, the lowermost portion of the borehole will be sampled for analysis.
- The boreholes will be augered through the surface of the drill pad (no samples/recovery is anticipated using direct push or split-spoon samplers).
- Once recoverable material or material that can be sampled is encountered, continuous coring will be conducted (using plastic sleeves) using direct push methods to a total depth below the former drill pit or to core refusal, whichever comes first. URS estimates that the boreholes will average 4 feet of augering and an additional 8 feet (two plastic sleeve cores) of continuous core recovery per borehole. URS will visually examine and log the subsurface materials for indications of impacts. If groundwater is encountered, this will be noted on the log.
- At a minimum, one soil sample will be collected per location, taken below the reported depth of the former drill pit (where impacts from the drill pit are most likely to occur). All intervals that appear to be impacted will be sampled.

Scope of Work to Address Ex. 6 - Personal Privacy *Allegations by Well Site:*

Teel #5 Well Site

Ex. 6 - Personal Privacy *alleges that a spill of diesel fuel occurred and that it was reported to PADEP but the amount was considerably underreported. He asserts that as much as 3,000 gallons was spilled and that it was "all through" the nearby creek area. Although the spill occurred in the middle of the night, it was not addressed until 6 a. m. He also asserts that the spill remediation measures were not adequate and that better measures should have been used. He says he believes a GasSearch Drilling Services (GDS) supervisor intentionally moved a reference point hay bale so that PADEP would incorrectly obtain a clean post-remediation soil sample. He asserts that diesel fuel can still be found at that site two feet under the soil/rock surface and that it is leaching into Meshoppen Creek.*

Ex. 6 - Personal Privacy *also alleges that the drill pit was not properly closed – that despite solidification efforts,*

Via Electronic Mail

material continued to "ooze" out and the pit was covered with twenty to thirty feet of soil when the well site was reclaimed.

Proposed Approach to Address Allegations – Teel #5 Well Site

URS has prepared an Act 2 Final Report evaluating a diesel release that occurred on June 3, 2008, remediation to address impacts, and attainment demonstration with the Statewide Health Standard for the Site. URS will review the results and conclusions of this report as part of our final report addressing Mr. Ely's allegations.

URS will collect surface water samples at three locations: (i) Meshoppen Creek, both upgradient and downgradient of the well site; and (ii) the pond immediately downgradient of the well site. These samples will be analyzed for the **Extended Analytical Suite** to evaluate for potential impacts from Site operations [COMPLETED].

URS will review and summarize all reports submitted on behalf of Cabot, including a report prepared by Resource Environmental Management, Inc., 8 Ridge Street, Montrose, PA, which was submitted to the PADEP for the Teel Property. (Notice was published in the PA Bulletin on October 11, 2008).

Analytical results from surface water sampling will be evaluated to address the allegation that impacts from the pit could have affected Meshoppen Creek and the nearby pond.

In addition, as discussed with PADEP (12/23/09), URS will evaluate for releases from the drill pit that was closed on the pad by advancing 2 soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**

Teel #7 Well Site

M Ex. 6 - Personal Privacy *alleges that the drill pit was not properly closed and that materials continued to ooze out. He expressed concern for sinking into the area where the pit is located and that materials could contaminate Meshoppen Creek.*

Proposed Approach to Address Allegations – Teel #7 Well Site

URS will collect surface water samples at three locations: (i) Meshoppen Creek, both upgradient and downgradient of the well site; and (ii) the wetland immediately downgradient of the well site, and analyze them for the **Extended Analytical Suite** to evaluate for potential impacts from Site operations [COMPLETED].

Via Electronic Mail

Analytical results from surface water sampling will be evaluated to address the allegation that impacts from the pit could have affected Meshoppen Creek and the nearby wetland.

In addition, as discussed with PADEP (12/23/09), URS will evaluate for releases from the drill pit that was closed on the pad by advancing 2 soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**.

Ely #2 Well Site

Ex. 6 - Personal Privacy *contends that a GDS supervisor ordered an employee to throw stones through the pit liner to make it look like his father, decedent* Ex. 6 - Personal Privacy *did so and to allege* Ex. 6 - Personal Privacy *sabotaged the site.* Ex. 6 - Personal Privacy *contends that the holes in the pit liner and the material that was in the pit was leaking through the liner and threatens the spring that is used for drinking and bathing.*

Proposed Approach to Address Allegations – Ely #2 Well Site

URS will collect surface water samples at two locations and analyze them for the **Extended Analytical Suite** to evaluate for potential impacts from Site operations. The spring located upgradient of the well site and the creek formed by the spring, downgradient of the well site and immediately to the east of Ely #2 well site, will be sampled [COMPLETED].

Analytical results from surface water sampling will be evaluated to address the allegation that impacts from the pit could have affected the adjacent spring and creek to the east.

As discussed with PADEP (12/23/09), URS will evaluate for releases from the drill pit that was closed on the pad by advancing 2 soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**.

Ely #5 Well Site

Ex. 6 - Personal Privacy *contends that the drill pit was improperly solidified and was backfilled.*

M Ex. 6 - Personal Privacy *contends that diesel fuel spills occurred beneath the drill rig and that attempts were made to cover the spills with plastic. He is concerned that these spills present a risk to his home, property and the creek nearby.*

Via Electronic Mail

Proposed Approach to Address Allegations – Ely #5 Well Site

URS will conduct test pit excavations at 4 locations distributed across the well site in the reported vicinity of the drill rig and where spills were alleged to have occurred. Eight soil samples will be collected (at 1-2 ft and 3-4 ft bgs) and analyzed for the **PA Short List for Diesel** to evaluate for potential impacts from the alleged fuel spills. A visual inspection of this location indicated that there is no creek nearby; however, URS will traverse the hillside immediately below the well site to evaluate for seeps, and, if present, sample the seeps and analyze those water samples for the **Extended Analytical Suite** to evaluate for potential impacts from Site operations.

As discussed with PADEP (12/23/09), URS will evaluate for releases from the two drill pits that were closed on the pad by advancing 4 soil test boreholes immediately downgradient of the location of the drill pits. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**.

Ely #4 / Ely #6 Well Site

Ex. 6 - Personal Privacy *says that frac fluid was released while fracing operations were being conducted. His r[illegible]'s house immediately downhill from the Well Site had to be evacuated and he is concerned that his relative's water supply and pond has been impacted (Note: this site was not on the original list of allegations).*

Proposed Approach to Address Allegations – Ely #4/Ely #6 Well Site

URS will:

- Conduct test pit excavations at 4 locations distributed across the well site and collect 8 soil samples (at 1-2 ft and 3-4 ft bgs at each location)
- Conduct three soil auger borings or test pit excavations along the potential migration pathway from the well pad to the downhill area and collect 6 soil samples (at 1-2 ft and 3- 4 ft bgs at each location)
- Collect water samples from the Spring House and Pond

All soil and water samples will be analyzed for the **Extended Analytical Suite** to evaluate for potential impacts from Site operations.

Lewis #2 Well Site

Ex. 6 - Personal Privacy *asserts that a diesel fuel spill occurred that "laid there all winter" and was reclaimed into the soil bank approximately one year ago when the site was reclaimed. Mr. Ely feels that several drill pits have been improperly reclaimed and that the liners were carelessly torn in the process of solidifying pit contents.*

Via Electronic Mail

Proposed Approach to Address Allegations – Lewis #2 Well Site

URS will collect surface water samples at two locations and analyze them for the Extended Analytical Suite to evaluate for potential impacts from Site operations. The creek immediately to the east of Lewis #2 Well Site, both upgradient and downgradient of the well site, will be sampled [COMPLETED].

Analytical results from surface water sampling in the adjacent creek will be evaluated to address the allegation that impacts from the pit could have affected the creek.

The location of the area where the soil that was allegedly impacted with diesel will be identified and test pit excavations will be conducted at 4 locations distributed across the identified area with 8 samples collected (at 1-2 ft and 3-4 ft bgs at each location). These soil samples will be analyzed for the **PA Short List for Diesel** to evaluate for potential impacts from the alleged released diesel.

As discussed with PADEP (12/23/09), URS will evaluate for releases from the drill pit that was closed on the pad by advancing 2 soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite** and **PA Short List for Diesel**.

Costello #1 Well Site

[Ex. 6 - Personal Privacy] contends that the drill pit liner was ripped open in the middle of winter and that a GDS supervisor told him not to be concerned and that it would be taken care of.

Proposed Approach to Address Allegations – Costello #1 Well Site

URS will collect surface water samples at three locations and analyze them for the Extended Analytical Suite to evaluate for potential impacts from Site operations. The creek immediately to the east of Costello #1 Well Site, both upgradient and downgradient of the well site, and the pond downgradient will be sampled [COMPLETED].

URS will contact the neighbor immediately downgradient of the Well Site and inquire about [Ex. 6 - Personal Privacy]'s further allegation that their water was discolored for a period of time. If possible, URS will work with Cabot's exclusive water sampling firm to collect a sample of their water before any treatment is performed.

Analytical results from surface water sampling and the drinking water source at the downgradient property will be evaluated to address the allegation that impacts from the pit could potentially have affected the environment.

Via Electronic Mail

As discussed with PADEP (12/23/09), URS will evaluate for releases from the drill pit that was closed on the pad by advancing 2 soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**.

Gesford #3 Well Site

Mr. Ely contends there were issues with four different pits at this site, that there were various spills and a large diesel fuel spill. His concern is heightened because his home is located nearby and below this site. He asserts that PADEP knew about one diesel spill, but not a second spill that occurred. He says the second spill was not reported to PADEP but was intentionally covered up with stone. He says PADEP eventually came out and learned that the spill was covered up. Mr. Ely also asserts a material that looked like antifreeze accumulated in the well cellar and was not addressed for months.

Mr. Ely also contends there was a pile of dirt mixed with diesel fuel on the back side of the site that remained "all summer long" close to a nearby creek that flows past Mr. Ely's home. He said PADEP sampled the situation and found diesel fuel and that all the dirt was hauled away thereafter.

Proposed Approach to Address Allegations – Gesford #3 Well Site

URS will collect surface water samples at two locations and analyze them for the **Extended Analytical Suite** to evaluate for potential impacts from Site operations. The creek immediately adjacent to the east of the well site, both upgradient and downgradient of the well site will be sampled [COMPLETED].

URS will also review and summarize all reports submitted on behalf of Cabot. Analytical results from surface water sampling will be evaluated and reports prepared for and by Cabot will be reviewed and summarized to address the allegation that impacts from the pits could potentially have affected the adjacent creek.

The location PADEP has documented to have diesel fuel impacts (the area between the former location of the drill rig and the former location of the mud pump) will be identified and test pit excavations will be conducted at 6 locations distributed across the identified area with 12 samples collected (at 1-2 ft and 3-4 ft bgs at each location). These soil samples will be analyzed for the **PA Short List for Diesel** to evaluate for potential impacts from the alleged released diesel. The test pits will be evaluated visually for the presence of drilling mud.

As discussed with PADEP (12/23/09), URS will evaluate for releases from the drill pit that was closed on the pad by advancing 4 soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for

Via Electronic Mail

indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**.

Gesford #7 Well Site

Ex. 6 - Personal Privacy *contends that a diesel fuel spill occurred but was reported to PADEP as a soap discharge. The spilled material can be found six inches below the gravel, as it was covered with stone.*

Approximately six weeks before the interview, Ex. 6 - Personal Privacy *alleges that recycled frac water leaked from a tank and impacted a 25' x 15' area with black water. The area where the leak occurred was not fully compacted and thus was porous.* Ex. 6 - Personal Privacy *asserts he was directed to cover the spilled material up and he refused. No material was reported to have left the well pad.*

Proposed Approach to Address Allegations – Gesford #7 Well Site

URS will conduct test pit excavations at 16 locations distributed across the well site to include the areas identified by Ex. 6 - Personal Privacy to have been impacted by frac water and diesel fuel and collect 32 samples (at 1-2 ft and 3-4 ft bgs at each location). These soil samples will be analyzed for the **Pit/Frac Analytical Suite** to evaluate for potential impacts from Site operations.

Brooks #1H Well Site

Ex. 6 - Personal Privacy *says that 168,000 gallons of fluids were put down the well and approximately 16,000 gallons came back. There was no way to shut down the well and the fluid ran down the hill side and into a nearby creek. There were soap suds in the creek and* Ex. 6 - Personal Privacy *dug a hole with a bulldozer to contain it. The water was "sucked up" and put into frac tanks.*

Proposed Approach to Address Allegations – Brooks #1H Well Site

URS will:

- Conduct test pit excavations at 4 locations distributed across the well site and collect 8 soil samples (at 1-2 ft and 3-4 ft bgs at each location)
- Conduct five soil auger borings or test pit excavations along the potential migration pathway from the well pad to the downhill area and collect 10 soil samples (at 1-2 ft and 3-4 ft bgs at each location)
- Collect surface water samples from the creek adjacent the site to the north [COMPLETED]

All samples will be analyzed for the **Extended Analytical Suite** to evaluate for potential impacts from Site operations.

Via Electronic Mail

Black #1 Well Site

Ex. 6 - Personal Privacy *asserts that there is a drill pit that continues to leach black liquid and the pit should have been removed. He alleges that the spring has been contaminated and that fish were killed in a nearby pond.*

Proposed Approach to Address Allegations – Black #1 Well Site

URS will collect surface water samples at two locations and analyze them for the Extended Analytical Suite to evaluate for potential impacts from Site operations. One catchment basin and the outlet from the adjacent pond (both immediately downgradient of the seep area from the well site) will be sampled [COMPLETED].

As discussed with PADEP (12/23/09), URS will evaluate for releases from the drill pit that was closed on the pad by advancing 2 soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**.

URS will review and summarize all reports submitted on behalf of Cabot and make recommendations regarding the disposition of the remediation system currently in place at the Site.

Analytical results from surface water sampling will be evaluated to address the allegation that impacts from the pit could potentially have affected the seep and/or the pond.

Chudleigh #1 Well Site

Ex. 6 - Personal Privacy *alleged that brine water was trucked to this well site and deposited in the mud pit. Interviews with site personnel identified the material as three truckloads of drilling fluid, not brine, from the Hunsinger well. Tears present in the mud pit liner that would allow the brine to infiltrate the subsurface were allegedly observed before the drilling fluid was off-loaded here.*

Proposed Approach to Address Allegations – Chudleigh #1 Well Site

URS will collect surface water samples at two locations and analyze them for the **Extended Analytical Suite** to evaluate for potential impacts from the alleged operations. The most immediate potential downgradient receptor stream will be identified and sampled, both upgradient and downgradient of the well site.

URS will further evaluate for releases from the drill pit by advancing two soil test boreholes immediately downgradient of the location of the drill pit. URS will visually examine and log the subsurface materials for indications of impacts from site operations. Visually identified zones of impact will be sampled. The sample(s) will be analyzed for the **Pit/Frac Analytical Suite**.

Via Electronic Mail

Teel #6 Well Site

Interviews with site personnel indicated that a drum containing petroleum products and antifreeze was buried at a location on the drill pad and subsequently excavated and removed from the location; however, the excavated drum contained only a portion of the material present when the drum was buried. This material in the subsurface could potentially enter Meshoppen Creek.

Teel #6 Well Site

Interviews with site personnel indicated that a drum containing petroleum products and antifreeze was buried at a location on the drill pad and subsequently excavated and removed from the location; however, the excavated drum contained only a portion of the material present when the drum was buried. This material in the subsurface could potentially enter Meshoppen Creek.

Proposed Approach to Address Allegations – Teel #6 Well Site

URS will attempt to determine the location at which the drum was allegedly buried before it was excavated and removed from the well pad. Once the approximate location has been determined, URS will conduct test pit excavations at 4 locations distributed across the approximate identified location and collect 12 samples (at 1-2 ft bgs, the approximate depth of burial of the drum, and at 1-2 ft below the approximate depth of the buried drum). These soil samples will be analyzed for a list of parameters consisting of the **PA Short Lists of Petroleum Products** encompassing all petroleum products, and glycols, to evaluate for potential impacts from a release from the drum identified in this allegation.

URS will also collect surface water samples at two locations on Meshoppen Creek, upgradient and downgradient of the well site. These samples will be analyzed for a list of parameters consisting of the **PA Short Lists of Petroleum Products** encompassing all petroleum products, and glycols. Analytical results from the surface water sampling will be evaluated to address the concern that the buried drum had potentially released material to the subsurface and could impact Meshoppen Creek.

Via Electronic Mail

URS appreciates the opportunity to prepare this scope of work for K&L Gates and Cabot. If there are any questions or comments regarding this proposal, please feel free to call me at (412) 503-4690.

Sincerely,

URS CORPORATION

Robert T. Hilliard
Principal Environmental Scientist/ Senior Project Manager

James Pinta, Jr., Ph.D., PG
PA Licensed Professional Geologist
A PG# PG000701G

Attachments: Table 1 and Table 2

Table 1
Analytical Suite - *Surface and Groundwater*
Second Revised Scope of Services for Preliminary Site Evaluations

Method	Analyte	PQL	Units
Volatile Organic Compounds			
8260 W	Acetone	10	ug/L
8260 W	Benzene	1	ug/L
8260 W	Bromochloromethane	1	ug/L
8260 W	Bromodichloromethane	1	ug/L
8260 W	Bromoform	1	ug/L
8260 W	Bromomethane	1	ug/L
8260 W	2-Butanone (MEK)	10	ug/L
8260 W	n-Butylbenzene	1	ug/L
8260 W	sec-Butylbenzene	1	ug/L
8260 W	Carbon disulfide	1	ug/L
8260 W	Carbon tetrachloride	1	ug/L
8260 W	Chlorobenzene	1	ug/L
8260 W	Chloroethane	1	ug/L
8260 W	Chloroform	1	ug/L
8260 W	Chloromethane	1	ug/L
8260 W	Dibromochloromethane	1	ug/L
8260 W	1,2-Dichlorobenzene	1	ug/L
8260 W	1,3-Dichlorobenzene	1	ug/L
8260 W	1,4-Dichlorobenzene	1	ug/L
8260 W	1,1-Dichloroethane	1	ug/L
8260 W	1,2-Dichloroethane	1	ug/L
8260 W	1,2-Dichloroethene (Total)	2	ug/L
8260 W	1,1-Dichloroethene	1	ug/L
8260 W	cis-1,2-Dichloroethene	1	ug/L
8260 W	trans-1,2-Dichloroethene	1	ug/L
8260 W	1,2-Dichloropropane	1	ug/L
8260 W	cis-1,3-Dichloropropene	1	ug/L
8260 W	trans-1,3-Dichloropropene	1	ug/L
8260 W	Ethylbenzene	1	ug/L
8260 W	2-Hexanone	10	ug/L
8260 W	Isopropylbenzene (Cumene)	1	ug/L
8260 W	p-Isopropyltoluene	1	ug/L
8260 W	Methylene Chloride	1	ug/L
8260 W	4-Methyl-2-pentanone (MIBK)	10	ug/L
8260 W	Methyl-tert-butyl ether	1	ug/L
8260 W	Naphthalene	2	ug/L
8260 W	n-Propylbenzene	1	ug/L
8260 W	Styrene	1	ug/L
8260 W	1,1,2,2-Tetrachloroethane	1	ug/L
8260 W	Tetrachloroethene	1	ug/L

Table 1
Analytical Suite - *Surface and Groundwater*
Second Revised Scope of Services for Preliminary Site Evaluations

Method	Analyte	PQL	Units
8260 W	Toluene	1	ug/L
8260 W	1,1,1-Trichloroethane	1	ug/L
8260 W	1,1,2-Trichloroethane	1	ug/L
8260 W	Trichloroethene	1	ug/L
8260 W	1,2,4-Trimethylbenzene	1	ug/L
8260 W	1,3,5-Trimethylbenzene	1	ug/L
8260 W	Vinyl chloride	1	ug/L
8260 W	Xylene (Total)	3	ug/L
8260 W	m&p-Xylene	2	ug/L
8260 W	o-Xylene	1	ug/L
8260 W	1,2,4-Trichlorobenzene	1	ug/L
8260 W	1,2-dibromoethane	1	ug/L

Semi-volatile Organic Compounds

8270 W	Phenol	1	ug/L
8270 W	bis(2-Chloroethyl) ether	1	ug/L
8270 W	2-Chlorophenol	1	ug/L
8270 W	1,3-Dichlorobenzene	1	ug/L
8270 W	1,4-Dichlorobenzene	1	ug/L
8270 W	Benzyl alcohol	1	ug/L
8270 W	1,2-Dichlorobenzene	1	ug/L
8270 W	2-Methylphenol(o-Cresol)	1	ug/L
8270 W	bis(2-Chloroisopropyl) ether	1	ug/L
8270 W	3&4-Methylphenol(m&p Cresol)	2	ug/L
8270 W	N-Nitroso-di-n-propylamine	1	ug/L
8270 W	Hexachloroethane	1	ug/L
8270 W	Nitrobenzene	1	ug/L
8270 W	Isophorone	1	ug/L
8270 W	2-Nitrophenol	1	ug/L
8270 W	2,4-Dimethylphenol	1	ug/L
8270 W	Benzoic acid	10	ug/L
8270 W	bis(2-Chloroethoxy)methane	1	ug/L
8270 W	2,4-Dichlorophenol	1	ug/L
8270 W	1,2,4-Trichlorobenzene	1	ug/L
8270 W	Naphthalene	1	ug/L
8270 W	4-Chloroaniline	1	ug/L
8270 W	Hexachloro-1,3-butadiene	1	ug/L
8270 W	4-Chloro-3-methylphenol	1	ug/L
8270 W	2-Methylnaphthalene	1	ug/L
8270 W	Hexachlorocyclopentadiene	1	ug/L
8270 W	2,4,6-Trichlorophenol	1	ug/L
8270 W	2,4,5-Trichlorophenol	2.5	ug/L

Table 1
Analytical Suite - *Surface and Groundwater*
Second Revised Scope of Services for Preliminary Site Evaluations

Method	Analyte	PQL	Units
8270 W	2-Chloronaphthalene	1	ug/L
8270 W	2-Nitroaniline	2.5	ug/L
8270 W	Dimethylphthalate	1	ug/L
8270 W	Acenaphthylene	1	ug/L
8270 W	2,6-Dinitrotoluene	1	ug/L
8270 W	3-Nitroaniline	2.5	ug/L
8270 W	Acenaphthene	1	ug/L
8270 W	2,4-Dinitrophenol	2.5	ug/L
8270 W	4-Nitrophenol	1	ug/L
8270 W	Dibenzofuran	1	ug/L
8270 W	2,4-Dinitrotoluene	1	ug/L
8270 W	Diethylphthalate	1	ug/L
8270 W	4-Chlorophenylphenyl ether	1	ug/L
8270 W	Fluorene	1	ug/L
8270 W	4-Nitroaniline	2.5	ug/L
8270 W	4,6-Dinitro-2-methylphenol	2.5	ug/L
8270 W	N-Nitrosodiphenylamine	1	ug/L
8270 W	4-Bromophenylphenyl ether	1	ug/L
8270 W	Hexachlorobenzene	1	ug/L
8270 W	Pentachlorophenol	2.5	ug/L
8270 W	Phenanthrene	1	ug/L
8270 W	Anthracene	1	ug/L
8270 W	Di-n-butylphthalate	1	ug/L
8270 W	Fluoranthene	1	ug/L
8270 W	Pyrene	1	ug/L
8270 W	Butylbenzylphthalate	1	ug/L
8270 W	3,3'-Dichlorobenzidine	1	ug/L
8270 W	Benzo(a)anthracene	1	ug/L
8270 W	Chrysene	1	ug/L
8270 W	bis(2-Ethylhexyl)phthalate	1	ug/L
8270 W	Di-n-octylphthalate	1	ug/L
8270 W	Benzo(b)fluoranthene	1	ug/L
8270 W	Benzo(k)fluoranthene	1	ug/L
8270 W	Benzo(a)pyrene	1	ug/L
8270 W	Indeno(1,2,3-cd)pyrene	1	ug/L
8270 W	Dibenz(a,h)anthracene	1	ug/L
8270 W	Benzo(g,h,i)perylene	1	ug/L
8270 W	N-Nitrosodimethylamine	1	ug/L
8270 W	Azobenzene	1	ug/L
8270 W	Carbazole	1	ug/L
8270 W	1-Methylnaphthalene	1	ug/L
8270 W	Tentatively Identified Compounds (10) - TICs		

Table 1
Analytical Suite - *Surface and Groundwater*
Second Revised Scope of Services for Preliminary Site Evaluations

Method	Analyte	PQL	Units
Target Analyte List Metals (Total)			
6010 Total	Aluminum	50	ug/L
6010 Total	Antimony	5	ug/L
6010 Total	Arsenic	5	ug/L
6010 Total	Barium	10	ug/L
6010 Total	Beryllium	1	ug/L
6010 Total	Boron	50	ug/L
6010 Total	Cadmium	1	ug/L
6010 Total	Chromium	5	ug/L
6010 Total	Cobalt	5	ug/L
6010 Total	Copper	5	ug/L
6010 Total	Iron	50	ug/L
6010 Total	Lead	2	ug/L
6010 Total	Manganese	5	ug/L
6010 Total	Molybdenum	20	ug/L
6010 Total	Nickel	10	ug/L
6010 Total	Selenium	5	ug/L
6010 Total	Silver	1	ug/L
6010 Total	Thallium	10	ug/L
6010 Total	Vanadium	5	ug/L
6010 Total	Zinc	10	ug/L
6010 Total	Calcium	1000	ug/L
6010 Total	Magnesium	200	ug/L
6010 Total	Sodium	1000	ug/L
6010 Total	Potassium	500	ug/L
7470 Total	Mercury	0.2	ug/L
Target Analyte List Metals (Dissolved)			
6010 Dissolved	Aluminum	50	ug/L
6010 Dissolved	Antimony	5	ug/L
6010 Dissolved	Arsenic	5	ug/L
6010 Dissolved	Barium	10	ug/L
6010 Dissolved	Beryllium	1	ug/L
6010 Dissolved	Boron	50	ug/L
6010 Dissolved	Cadmium	1	ug/L
6010 Dissolved	Chromium	5	ug/L
6010 Dissolved	Cobalt	5	ug/L
6010 Dissolved	Copper	5	ug/L
6010 Dissolved	Iron	50	ug/L
6010 Dissolved	Lead	2	ug/L

Table 1
Analytical Suite - *Surface and Groundwater*
Second Revised Scope of Services for Preliminary Site Evaluations

Method	Analyte	PQL	Units
6010 Dissolved	Manganese	5	ug/L
6010 Dissolved	Molybdenum	20	ug/L
6010 Dissolved	Nickel	10	ug/L
6010 Dissolved	Selenium	5	ug/L
6010 Dissolved	Silver	1	ug/L
6010 Dissolved	Thallium	10	ug/L
6010 Dissolved	Vanadium	5	ug/L
6010 Dissolved	Zinc	10	ug/L
6010 Dissolved	Calcium	1000	ug/L
6010 Dissolved	Magnesium	200	ug/L
6010 Dissolved	Sodium	1000	ug/L
6010 Dissolved	Potassium	500	ug/L
7470 Dissolved	Mercury	0.2	ug/L

PA Short List for Diesel

8260	Benzene	5	ug/kg
8260	Toluene	5	ug/kg
8260	Ethylbenzene	5	ug/kg
8260	Isopropylbenzene (Cumene)	5	ug/kg
8260	Methyl-tert-butyl ether	1	ug/L
8260	Naphthalene	333	ug/kg
8260	1,3,5-Trimethylbenzene	5	ug/kg
8260	1,2,4-Trimethylbenzene	5	ug/kg

Combined - PA Short List for Petroleum Products

8260	Benzene	1	ug/L
8260	Toluene	1	ug/L
8260	Ethylbenzene	1	ug/L
8260	Xylene (Total)	3	ug/L
8260	Isopropylbenzene (Cumene)	1	ug/L
8260	Naphthalene	2	ug/L
8260	1,3,5-Trimethylbenzene	1	ug/L
8260	1,2,4-Trimethylbenzene	1	ug/L
8260	1,2-Dichloroethane	1	ug/L
8260	1,2-dibromoethane	1	ug/L
8260	Methyl-tert-butyl ether	1	ug/L
6010 S	Lead	2	ug/L
8270	Fluorene	1	ug/L

Table 1
Analytical Suite - *Surface and Groundwater*
Second Revised Scope of Services for Preliminary Site Evaluations

Method	Analyte	PQL	Units
8270	Anthracene	1	ug/L
8270	Phenanthrene	1	ug/L
8270	Pyrene	1	ug/L
8270	Benzo(a)anthracene	1	ug/L
8270	Chrysene	1	ug/L
8270	Benzo(b)fluoranthene	1	ug/L
8270	Benzo(a)pyrene	1	ug/L
8270	Benzo(g,h,i)perylene	1	ug/L
8270	Indeno(1,2,3-cd)pyrene	1	ug/L

Indicator Parameters & General Chemistry

8015	Glycols	100.0	mg/L
8015	TPH (C06-C10)	200	ug/L
8015 WD	Diesel Components	0.1	mg/L
1664 WH	Total Petroleum Hydrocarbons	5	mg/L
5540C W	Surfactants	0.1	mg/L
4500 CIE W	Chloride	3	mg/L
4500H+B	pH at 25 Degrees C	1	Std. Units
3501 W	Nitrogen, Ammonia	0.1	mg/L
2310B W	Acidity, Total	10	mg/L
2320BW	Alkalinity, Total as CaCO3	10	mg/L
2540C W	Total Dissolved Solids	10	mg/L

Table 2
Analytical Suite - *Soils*
Second Revised Scope of Work for Preliminary Site Evaluations

Method	Analyte	PQL	Units
Volatile Organic Compounds			
8260	Chloromethane	5	ug/kg
8260	Vinyl chloride	5	ug/kg
8260	Bromomethane	5	ug/kg
8260	Chloroethane	5	ug/kg
8260	Methylene Chloride	5	ug/kg
8260	1,1-Dichloroethene	5	ug/kg
8260	trans-1,2-Dichloroethene	5	ug/kg
8260	1,1-Dichloroethane	5	ug/kg
8260	cis-1,2-Dichloroethene	5	ug/kg
8260	Chloroform	5	ug/kg
8260	1,1,1-Trichloroethane	5	ug/kg
8260	Carbon tetrachloride	5	ug/kg
8260	Benzene	5	ug/kg
8260	1,2-Dichloroethane	5	ug/kg
8260	Trichloroethene	5	ug/kg
8260	1,2-Dichloropropane	5	ug/kg
8260	Bromodichloromethane	5	ug/kg
8260	trans-1,3-Dichloropropene	5	ug/kg
8260	Toluene	5	ug/kg
8260	cis-1,3-Dichloropropene	5	ug/kg
8260	1,1,2-Trichloroethane	5	ug/kg
8260	Tetrachloroethene	5	ug/kg
8260	Dibromochloromethane	5	ug/kg
8260	Chlorobenzene	5	ug/kg
8260	Ethylbenzene	5	ug/kg
8260	m&p-Xylene	10	ug/kg
8260	o-Xylene	5	ug/kg
8260	Xylene (Total)	15	ug/kg
8260	Styrene	5	ug/kg
8260	Bromoform	5	ug/kg
8260	Isopropylbenzene (Cumene)	5	ug/kg
8260	1,1,2,2-Tetrachloroethane	5	ug/kg
8260	n-Propylbenzene	5	ug/kg
8260	1,3,5-Trimethylbenzene	5	ug/kg
8260	1,2,4-Trimethylbenzene	5	ug/kg
8260	sec-Butylbenzene	5	ug/kg
8260	p-Isopropyltoluene	5	ug/kg
8260	1,3-Dichlorobenzene	5	ug/kg
8260	1,4-Dichlorobenzene	5	ug/kg
8260	n-Butylbenzene	5	ug/kg

Table 2
Analytical Suite - *Soils*
Second Revised Scope of Work for Preliminary Site Evaluations

Method	Analyte	PQL	Units
8260	1,2-Dichlorobenzene	5	ug/kg
8260	Naphthalene	5	ug/kg
8260	1,2-dibromoethane	5	ug/kg
8260	1,2-Dichloroethene (Total)	10	ug/kg
8260	2-Butanone (MEK)	10	ug/kg
8260	2-Hexanone	10	ug/kg
8260	Carbon disulfide	5	ug/kg
8260	Acetone	10	ug/kg
8260	Methyl-tert-butyl ether	5	ug/kg
8260	4-Methyl-2-pentanone (MIBK)	10	ug/kg
8260	TOTAL BTEX	30	ug/kg
8260	Phenol	333	ug/kg
8260	bis(2-Chloroethyl) ether	333	ug/kg
8260	2-Chlorophenol	333	ug/kg
8260	1,3-Dichlorobenzene	333	ug/kg
8260	1,4-Dichlorobenzene	333	ug/kg
8260	Benzyl alcohol	333	ug/kg
8260	1,2-Dichlorobenzene	333	ug/kg
8260	2-Methylphenol(o-Cresol)	333	ug/kg
8260	bis(2-Chloroisopropyl) ether	333	ug/kg
8260	N-Nitroso-di-n-propylamine	333	ug/kg
8260	Hexachloroethane	333	ug/kg
8260	Nitrobenzene	333	ug/kg
8260	Isophorone	333	ug/kg
8260	2-Nitrophenol	333	ug/kg
8260	2,4-Dimethylphenol	333	ug/kg
8260	bis(2-Chloroethoxy)methane	333	ug/kg
8260	2,4-Dichlorophenol	333	ug/kg
8260	1,2,4-Trichlorobenzene	333	ug/kg
8260	Naphthalene	333	ug/kg

Semi-volatile Organic Compounds

8270	4-Chloroaniline	333	ug/kg
8270	Hexachloro-1,3-butadiene	333	ug/kg
8270	4-Chloro-3-methylphenol	333	ug/kg
8270	2-Methylnaphthalene	333	ug/kg
8270	Hexachlorocyclopentadiene	333	ug/kg
8270	2,4,6-Trichlorophenol	333	ug/kg
8270	2,4,5-Trichlorophenol	833	ug/kg
8270	2-Chloronaphthalene	333	ug/kg
8270	2-Nitroaniline	833	ug/kg

Table 2
Analytical Suite - *Soils*
Second Revised Scope of Work for Preliminary Site Evaluations

Method	Analyte	PQL	Units
8270	Dimethylphthalate	333	ug/kg
8270	Acenaphthylene	333	ug/kg
8270	2,6-Dinitrotoluene	333	ug/kg
8270	3-Nitroaniline	833	ug/kg
8270	Acenaphthene	333	ug/kg
8270	2,4-Dinitrophenol	833	ug/kg
8270	4-Nitrophenol	333	ug/kg
8270	Dibenzofuran	333	ug/kg
8270	2,4-Dinitrotoluene	333	ug/kg
8270	Diethylphthalate	333	ug/kg
8270	4-Chlorophenylphenyl ether	333	ug/kg
8270	Fluorene	333	ug/kg
8270	4-Nitroaniline	833	ug/kg
8270	4,6-Dinitro-2-methylphenol	833	ug/kg
8270	N-Nitrosodiphenylamine	333	ug/kg
8270	4-Bromophenylphenyl ether	333	ug/kg
8270	Hexachlorobenzene	333	ug/kg
8270	Pentachlorophenol	833	ug/kg
8270	Phenanthrene	333	ug/kg
8270	Anthracene	333	ug/kg
8270	Di-n-butylphthalate	333	ug/kg
8270	Fluoranthene	333	ug/kg
8270	Pyrene	333	ug/kg
8270	Butylbenzylphthalate	333	ug/kg
8270	3,3'-Dichlorobenzidine	333	ug/kg
8270	Benzo(a)anthracene	333	ug/kg
8270	Chrysene	333	ug/kg
8270	bis(2-Ethylhexyl)phthalate	333	ug/kg
8270	Di-n-octylphthalate	333	ug/kg
8270	Benzo(b)fluoranthene	333	ug/kg
8270	Benzo(k)fluoranthene	333	ug/kg
8270	Benzo(a)pyrene	333	ug/kg
8270	Indeno(1,2,3-cd)pyrene	333	ug/kg
8270	Dibenz(a,h)anthracene	333	ug/kg
8270	Benzo(g,h,i)perylene	333	ug/kg
8270	3&4-Methylphenol(m&p Cresol)	666	ug/kg
8270	Tentatively Identified Compounds (10) - TICs		

Target Analyte List Metals

6010 S	Aluminum	10	mg/kg
6010 S	Antimony	0.5	mg/kg
6010 S	Arsenic	0.5	mg/kg

Table 2
Analytical Suite - *Soils*
Second Revised Scope of Work for Preliminary Site Evaluations

Method	Analyte	PQL	Units
6010 S	Barium	2	mg/kg
6010 S	Beryllium	0.2	mg/kg
6010 S	Boron	5	mg/kg
6010 S	Cadmium	0.2	mg/kg
6010 S	Chromium	0.5	mg/kg
6010 S	Cobalt	1	mg/kg
6010 S	Copper	1	mg/kg
6010 S	Iron	10	mg/kg
6010 S	Lead	0.5	mg/kg
6010 S	Manganese	1	mg/kg
6010 S	Molybdenum	2	mg/kg
6010 S	Nickel	2	mg/kg
6010 S	Selenium	0.5	mg/kg
6010 S	Silver	0.2	mg/kg
6010 S	Thallium	2	mg/kg
6010 S	Vanadium	1	mg/kg
6010 S	Zinc	1	mg/kg
6010 S	Calcium	200	mg/kg
6010 S	Magnesium	50	mg/kg
6010 S	Sodium	500	mg/kg
6010 S	Potassium	50	mg/kg
7471 S	Mercury		mg/kg

PA Short List for Diesel

8260	Benzene	5	ug/kg
8260	Toluene	5	ug/kg
8260	Ethylbenzene	5	ug/kg
8260	Isopropylbenzene (Cumene)	5	ug/kg
8260	Methyl-tert-butyl ether	5	ug/kg
8260	Naphthalene	333	ug/kg
8260	1,3,5-Trimethylbenzene	5	ug/kg
8260	1,2,4-Trimethylbenzene	5	ug/kg
8260	Methyl-tert-butyl ether	5	ug/kg

Combined - PA Short List for Petroleum Products

8260	Benzene	5	ug/kg
8260	Toluene	5	ug/kg
8260	Ethylbenzene	5	ug/kg
8260	Xylene (Total)	15	ug/kg
8260	Isopropylbenzene (Cumene)	5	ug/kg

Table 2
Analytical Suite - *Soils*
Second Revised Scope of Work for Preliminary Site Evaluations

Method	Analyte	PQL	Units
8260	Naphthalene	333	ug/kg
8260	1,3,5-Trimethylbenzene	5	ug/kg
8260	1,2,4-Trimethylbenzene	5	ug/kg
8260	1,2-Dichloroethane	5	ug/kg
8260	1,2-dibromoethane	5	ug/kg
8260	Methyl-tert-butyl ether	5	ug/kg
6010 S	Lead	0.5	mg/kg
8270	Fluorene	333	ug/kg
8270	Anthracene	333	ug/kg
8270	Phenanthrene	333	ug/kg
8270	Pyrene	333	ug/kg
8270	Benzo(a)anthracene	333	ug/kg
8270	Chrysene	333	ug/kg
8270	Benzo(b)fluoranthene	333	ug/kg
8270	Benzo(a)pyrene	333	ug/kg
8270	Benzo(g,h,i)perylene	333	ug/kg
8270	Indeno(1,2,3-cd)pyrene	333	ug/kg

Indicator Parameters

8015	Glycols	100	mg/kg
8015	Gasoline Range Organics	10	mg/kg
8015 SD	Diesel Components	6.67	mg/kg
1664	TPH	10	mg/kg
ASTM	Extraction for MBAS + Chlorides	NA	NA
5540C	MBAS Surfatactants (Extracted)	0.1	mg/L
4500	Chloride (Extracted)	3	mg/L
9045 SL	pH at 25 Degrees C	1	Std. Units
3501 S	Nitrogen, Ammonia	5	mg/kg

APPENDIX B

URS

Page 1 of 1

Job KLG Project No. 39939654.09001 Sheet 1 of

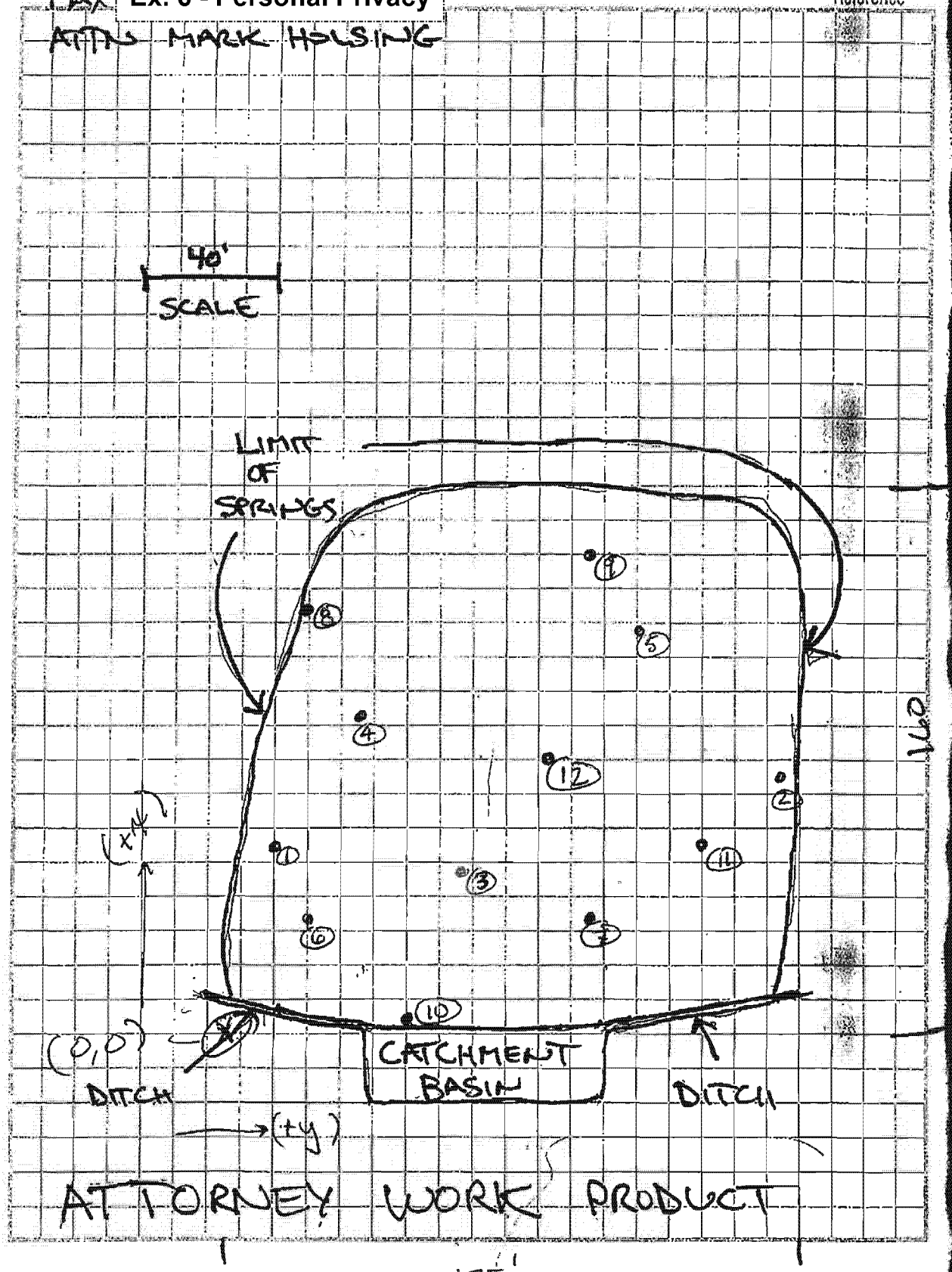
Description BLACK 1 H Computed by DAW Date 6/28/10

Checked by Date

Ex. 6 - Personal Privacy

FAX Reference

ATTN MARK HOLSING



Coordinates of 3-D Systematic Random Sampling Points

Note: Sampling points that are not within the area of contamination should be dis

0th Row		
Xi,	Yi	Zi
14.5	55.4	2.8 (1)
19.5	55.2	7.8
55.2	69.0	2.3
79.9	66.4	5.4
90.2	55.4	7.7
121.7	68.8	6.8
132.6	65.7	9.8
145.7	56.5	7.6 (11)
163.9	62.5	7.2

1st Row		
Xi,	Yi	Zi
4.2	82.0	7.9
23.8	75.1	4.1
44.6	79.5	3.0
65.8	84.4	5.1
88.9	85.0	9.3
96.8	80.4	7.0 (12)
109.4	71.3	5.3
135.3	86.6	7.9
163.3	81.8	6.5
172.5	75.6	2.6 (2)

-1st Row		
Xi,	Yi	Zi
20.4	41.3	6.8
28.4	39.7	9.7
62.9	46.9	5.0
71.3	47.8	4.2 (3)
86.5	40.9	2.3
124.7	51.1	9.0
141.1	37.3	9.0
155.5	52.6	3.6

carded. You will need to generate another group of data sets if the number of v

2nd Row		
Xi,	Yi	Zi
6.3	100.8	3.9
23.3	98.2	3.4
45.0	93.6	6.3
70.8	90.6	3.4
84.7	98.0	6.1
114.1	102.2	5.8
119.8	94.9	8.7
149.4	91.9	8.7

(4)

3rd Row		
Xi,	Yi	Zi
18.0	117.5	6.2
45.0	108.8	3.7
65.1	116.0	6.7
78.5	106.0	4.8
89.4	109.3	2.8
125.8	118.0	4.6
131.2	108.5	6.3
165.8	117.4	3.9
166.1	105.0	7.6

(5)

-2nd Row		
Xi,	Yi	Zi
23.8	36.9	5.5
25.5	21.3	6.7
46.9	20.5	4.7
69.2	28.0	3.7
82.6	23.0	2.1
106.4	23.7	7.3
123.8	34.4	6.2
152.2	27.9	8.3

(6)

-3rd Row		
Xi,	Yi	Zi
14.2	6.0	2.3
41.5	3.6	4.1
56.1	11.7	2.3
75.1	8.4	8.4
111.7	19.1	4.6
118.0	8.0	7.8
135.8	17.6	4.4
168.5	18.9	9.1

(7)

alid data sets in a group is less than the minimum number of samples otherwise r

4th Row		
Xi,	Yi	Zi
17.6	128.6	9.6
25.2	125.9	7.8 (8)
57.6	127.7	8.5
73.1	135.8	8.7
96.9	129.9	4.2
117.4	137.0	4.9
121.7	129.3	3.9
145.4	129.8	2.3
165.4	135.5	5.3

5th Row		
Xi,	Yi	Zi
21.6	141.7	2.6
47.9	150.3	6.7
54.5	154.1	2.4
87.8	153.2	4.2
97.2	152.9	9.1
108.3	140.6	6.5 (9)
137.8	151.1	2.2
152.0	153.5	2.5
167.8	140.8	7.6

4th Row		
Xi,	Yi	Zi
55.1	2.8	8.6 (10)
172.1	0.1	8.8

5th Row		
Xi,	Yi	Zi

equired.

6th Row		
Xi,	Yi	Zi
168.1	158.3	2.9

7th Row		
Xi,	Yi	Zi

-6th Row		
Xi,	Yi	Zi

-7th Row		
Xi,	Yi	Zi

8th Row		
Xi,	Yi	Zi

9th Row		
Xi,	Yi	Zi

8th Row		
Xi,	Yi	Zi

9th Row		
Xi,	Yi	Zi

10th Row		
Xi,	Yi	Zi

-10th Row		
Xi,	Yi	Zi

URS

Job KLG | Project No. | Page ____ of ____

Description CROSSROAD #7 RANDOM SAMPLE GRID / SAMPLE PT | Computed by | Sheet ____ of ____

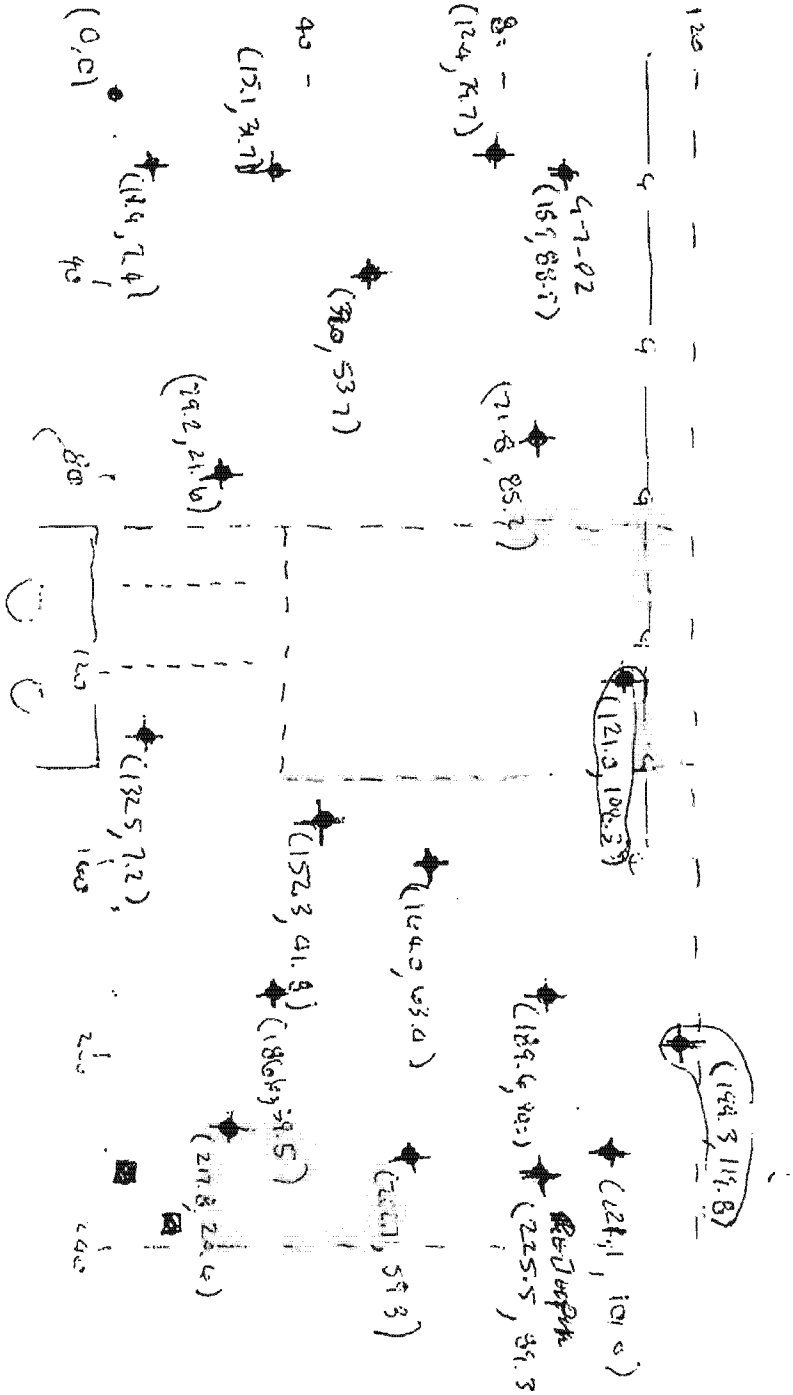
Checked by | Date | Date

Reference

14 RANDOM LOCATIONS

2 BIASED LOCATIONS TBD

- 1 DUPLICATE TO BE TAKEN.



Systematic Random Sampling Workbook

Pennsylvania Department of Environmental Protection
Land Recycling Program
Version Date : January 26, 2000

Please forward comments or suggestions to Samuel Fang at fang.samuel@dep.state.pa.us.

Coordinates of 3-D Systematic Random Sampling Points

Note: Sampling points that are not within the area of contamination should be dis

0th Row		
Xl,	Yi	Zi
1.2	87.1	2.6
12.4	79.7	3.2
28.2	77.8	7.9
51.6	77.3	9.7
71.8	85.2	9.2
70.3	76.7	5.2
84.9	79.1	7.4
104.8	78.3	7.6
117.4	77.6	2.4
143.5	84.8	2.8
163.8	86.9	4.8
170.9	78.4	5.5
177.0	79.5	8.7
207.7	84.8	8.5
214.0	79.2	6.3
225.5	83.3	7.4

1st Row		
Xi,	Yi	Zi
9.6	92.1	7.3
18.9	88.9	9.2
42.3	91.3	5.2
63.4	99.6	2.7
63.2	92.2	8.4
93.7	96.8	5.4
101.9	97.3	5.9
116.3	98.3	7.9
138.6	96.0	7.2
156.8	99.7	4.1
163.1	96.1	5.9
182.2	96.1	7.4
189.6	90.0	5.1
206.2	95.4	2.8
217.6	93.4	7.3

-1st Row		
Xi,	Yi	Zi
4.6	67.6	6.9
25.4	64.4	7.0
36.4	71.0	8.8
46.5	65.3	3.1
70.2	64.3	8.6
86.2	61.0	3.6
94.2	65.7	8.2
120.4	62.8	2.1
127.0	71.1	4.6
146.4	63.4	2.2
164.0	65.2	3.1
181.9	68.9	7.5
187.6	61.6	2.7
218.4	74.1	5.2
225.8	61.1	8.8
237.2	61.6	8.4

iscarded. You will need to generate another group of data sets if the number of

2nd Row		
Xi,	Yi	Zi
5.0	101.4	3.1
8.8	104.4	7.0
37.8	105.5	4.4
44.9	105.1	9.4
55.1	102.8	8.1
73.9	105.1	3.6
95.0	104.5	5.2
105.5	108.7	5.9
121.0	108.3	9.8
133.5	111.3	8.2
150.6	102.9	3.6
169.1	103.2	3.5
181.9	109.7	4.4
197.5	110.3	5.9
212.4	105.4	3.6
221.1	101.0	8.7

3rd Row		
Xi,	Yi	Zi
19.6	117.3	2.4
96.6	116.7	2.2
148.4	116.1	8.5
157.7	116.4	6.1
182.7	119.0	7.8
188.0	114.7	9.8
199.3	119.8	4.1

-2nd Row		
Xi,	Yi	Zi
1.1	56.6	8.5
22.3	58.7	8.2
39.0	53.7	8.7
44.0	55.9	9.8
62.8	56.9	8.0
74.6	49.0	2.4
86.5	50.8	5.8
106.6	54.8	4.6
129.4	57.5	7.1
142.2	54.4	9.7
158.5	51.0	5.2
173.9	55.0	3.8
182.5	50.5	4.3
203.7	50.1	5.8
222.7	59.3	2.2
229.3	57.5	4.5

-3rd Row		
Xi,	Yi	Zi
5.7	35.5	7.4
21.3	38.7	7.3
45.2	41.2	8.9
50.5	37.9	7.7
71.4	38.9	7.1
83.1	40.5	8.9
96.9	43.0	2.1
123.9	43.2	7.9
127.3	44.4	5.6
152.3	41.8	8.3
160.0	44.9	5.7
169.5	38.4	4.0
186.6	39.5	7.4
215.5	47.0	2.5
221.1	39.6	6.8
238.7	38.2	8.6

valid data sets in a group is less than the minimum number of samples otherwise r

4th Row		
Xi,	Yi	Zi

5th Row		
Xi,	Yi	Zi

-4th Row		
Xi,	Yi	Zi
15.1	31.7	2.1
29.9	34.0	3.5
52.1	25.0	4.3
52.6	23.2	3.1
79.2	21.6	8.0
98.1	24.5	5.6
104.4	29.2	4.5
125.9	28.3	3.5
133.0	29.0	8.4
146.1	25.7	9.3
169.0	29.1	4.1
189.4	27.1	3.6
199.7	33.9	7.3
222.3	30.0	9.4
224.4	30.7	8.7

-5th Row		
Xi,	Yi	Zi
2.4	13.2	7.1
21.6	21.1	6.7
36.5	9.6	3.9
61.3	20.5	9.1
70.3	18.1	4.4
82.2	10.8	7.4
95.8	18.5	2.2
113.9	10.3	4.2
136.6	14.3	8.1
141.1	11.8	9.5
154.8	9.4	7.9
173.1	20.6	8.4
181.2	8.9	7.7
217.8	20.6	7.8
221.2	16.5	6.7

required.

6th Row		
Xi,	Yi	Zi

7th Row		
Xi,	Yi	Zi

-6th Row		
Xi,	Yi	Zi
11.9	7.4	7.5
19.4	6.5	2.3
83.5	2.3	6.1
92.7	5.3	5.5
132.5	7.2	2.1
228.6	3.4	6.8

-7th Row		
Xi,	Yi	Zi

8th Row		
Xi,	Yi	Zi

9th Row		
Xi,	Yi	Zi

-8th Row		
Xi,	Yi	Zi

-9th Row		
Xi,	Yi	Zi

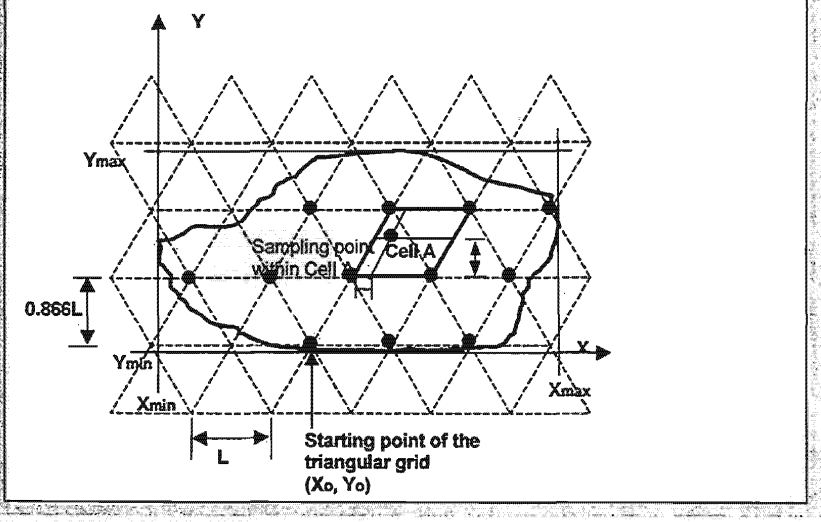
10th Row		
Xi,	**Yi**	**Zi**

-10th Row		
Xi,	**Yi**	**Zi**

Systematic Random Sampling Workbook

Area of Contamination (Square feet):	4000	
Depth Zone (feet):	2	10
Volume of Contaminated Soil (Cubic Yards):	1185	
Number of Soil Samples: (If you are applying 75%-10X or 75%-2X rule, the spreadsheet will determine the minimum number of samples for you. Otherwise, please specify the number of samples here. Limitations: The maximum number of samples per row is ten. The maximum number of rows is ten. ---->)	20	
75%-rule Number of Soil Samples:	20	
L = Cell Spacing (feet):	15.2	
0.866*L (feet):	13.2	
Xmin (feet):	0	
Xmax (feet):	240	
Ymin (feet):	0	
Ymax (feet):	120	
Xo (feet):	112.1	
Yo (feet):	74.2	

Example



Triangular Grid Node Coordinate Pairs

0th Row (Xi, Yi)	
-9.5	74.2
5.7	74.2
20.9	74.2
36.1	74.2
51.3	74.2
66.5	74.2
81.7	74.2
96.9	74.2
Starting Point ---->	
127.3	74.2
142.5	74.2
157.7	74.2
172.9	74.2
188.1	74.2
203.3	74.2
218.5	74.2
233.7	74.2

1st Row (Xi, Yi)	
-1.9	87.4
13.3	87.4
28.5	87.4
43.7	87.4
58.9	87.4
74.1	87.4
89.3	87.4
104.5	87.4
119.7	87.4
134.9	87.4
150.1	87.4
165.3	87.4
180.5	87.4
195.7	87.4
210.9	87.4
226.1	87.4

-1st Row (Xi, Yi)	
-1.9	61
13.3	61
28.5	61
43.7	61
58.9	61
74.1	61
89.3	61
104.5	61
119.7	61
134.9	61
150.1	61
165.3	61
180.5	61
195.7	61
210.9	61
226.1	61

2nd Row (Xi, Yi)	
-9.5	100.6
5.7	100.6
20.9	100.6
36.1	100.6
51.3	100.6
66.5	100.6
81.7	100.6
96.9	100.6
112.1	100.6
127.3	100.6
142.5	100.6
157.7	100.6
172.9	100.6
188.1	100.6
203.3	100.6
218.5	100.6
233.7	100.6

3rd Row (Xl, Yl)	
-1.9	113.8
13.3	113.8
28.5	113.8
43.7	113.8
58.9	113.8
74.1	113.8
89.3	113.8
104.5	113.8
119.7	113.8
134.9	113.8
150.1	113.8
165.3	113.8
180.5	113.8
195.7	113.8
210.9	113.8
226.1	113.8

4th Row (Xi, Yl)	

-2nd Row (Xi, Yi)	
-9.5	47.8
5.7	47.8
20.9	47.8
36.1	47.8
51.3	47.8
66.5	47.8
81.7	47.8
96.9	47.8
112.1	47.8
127.3	47.8
142.5	47.8
157.7	47.8
172.9	47.8
188.1	47.8
203.3	47.8
218.5	47.8
233.7	47.8

-3rd Row (Xi, Yi)	
-1.9	34.6
13.3	34.6
28.5	34.6
43.7	34.6
58.9	34.6
74.1	34.6
89.3	34.6
104.5	34.6
119.7	34.6
134.9	34.6
150.1	34.6
165.3	34.6
180.5	34.6
195.7	34.6
210.9	34.6
226.1	34.6

-4th Row (Xi, Yi)	
-9.5	21.4
5.7	21.4
20.9	21.4
36.1	21.4
51.3	21.4
66.5	21.4
81.7	21.4
96.9	21.4
112.1	21.4
127.3	21.4
142.5	21.4
157.7	21.4
172.9	21.4
188.1	21.4
203.3	21.4
218.5	21.4
233.7	21.4

5th Row (Xi, Yi)

6th Row (Xi, Yi)

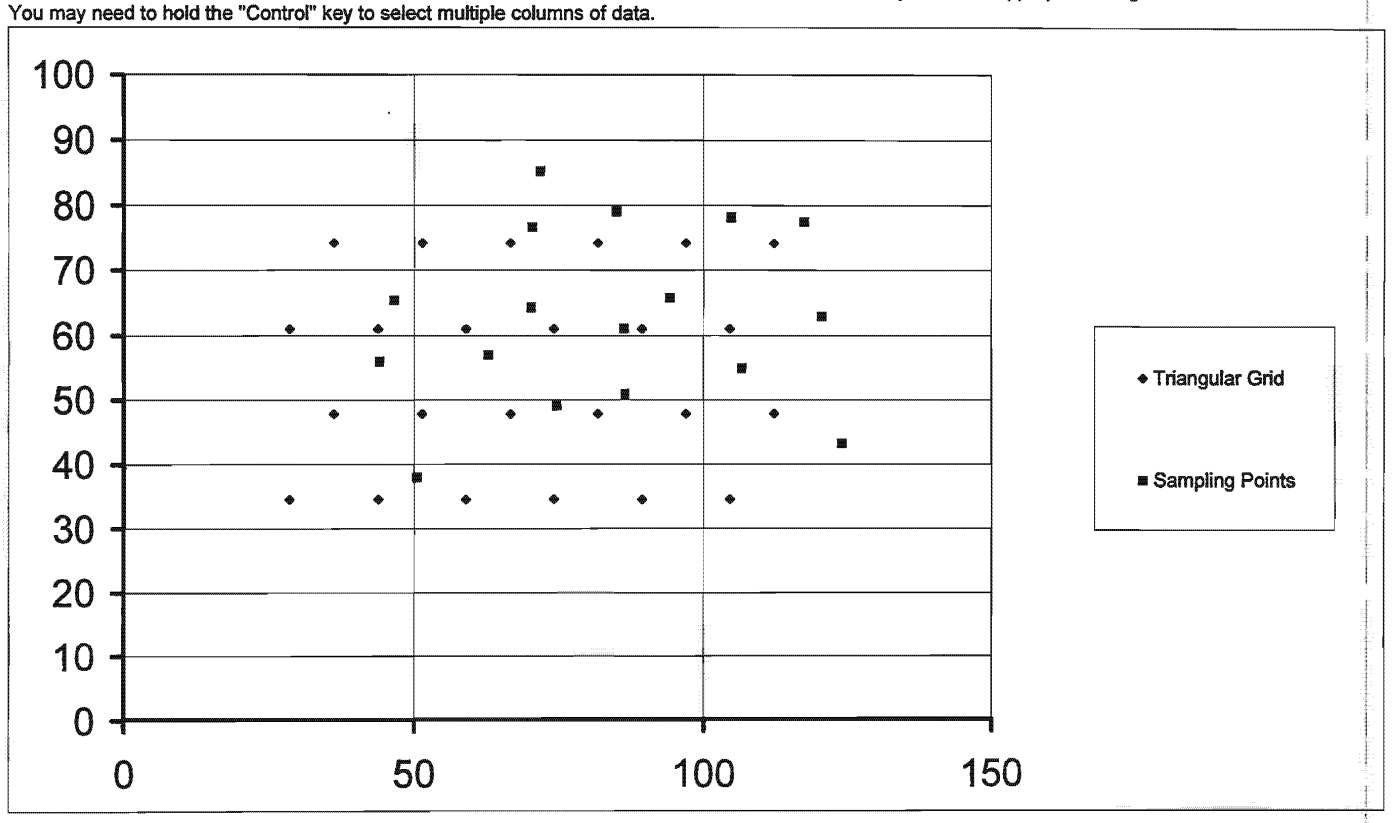
-5th Row (Xi, Yi)	
-1.9	8.2
13.3	8.2
28.5	8.2
43.7	8.2
58.9	8.2
74.1	8.2
89.3	8.2
104.5	8.2
119.7	8.2
134.9	8.2
150.1	8.2
165.3	8.2
180.5	8.2
195.7	8.2
210.9	8.2
226.1	8.2

-6th Row (Xi, Yi)	
-9.5	-5
5.7	-5
20.9	-5
36.1	-5
51.3	-5
66.5	-5
81.7	-5
96.9	-5
112.1	-5
127.3	-5
142.5	-5
157.7	-5
172.9	-5
188.1	-5
203.3	-5
218.5	-5
233.7	-5

7th Row **(Xi, Yi)**	8th Row **(Xi, Yi)**
-7th Row **(Xi, Yi)**	-8th Row **(Xi, Yi)**

9th Row **(Xi, Yi)**	10th Row **(Xl, Yl)**
-9th Row **(Xi, Yi)**	-10th Row **(Xl, Yi)**

Note: The 'Source Data' may need to be adjusted manually in order to allow the triangular grid pattern and sampling points to appear.
Move the mouse pointer to the center of the plot area and then right-click the mouse. Select 'Source Data' from the menu.
Select 'Series' tab. Click collapse dialog buttons at the right end of X Values and Y Values boxes to adjust for the appropriate ranges of source data.
You may need to hold the "Control" key to select multiple columns of data.



Triangular Grid Node Coordinates

	Xi (Even Row)	Xi (Odd Row)	Yi
-10			
-9			
-8	-9.5	-1.9	
-7	5.7	13.3	
-6	20.9	28.5	-5.0
-5	36.1	43.7	8.2
-4	51.3	58.9	21.4
-3	66.5	74.1	34.6
-2	81.7	89.3	47.8
-1	96.9	104.5	61.0
0		119.7	
1	127.3	134.9	87.4
2	142.5	150.1	100.6
3	157.7	165.3	113.8
4	172.9	180.5	
5	188.1	195.7	
6	203.3	210.9	
7	218.5	226.1	
8	233.7		
9			
10			